HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY

CHAPTER 76

L.E.P. 1- 2 Revised to Reflect this revision indicating new,revised, and/or deleted pages

76-11-00 Minor additions and amplification
501- 502, **REVISED ACCESS PANELS.**
504, 506, **SUPERSEDED TOOL 97A76102008000 BY TOOL**
509 **98A76103004000.**
SUPERSEDED TOOL 97A76102500002 BY TOOL
86539A4254000.
Layout improved

76-11-12 Minor additions and amplification
401- 402, **DELETED THE EQUIPMENT 97A2730200900.**
405- 406 Layout improved

CHAPTER 76

ENGINE CONTROLS

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

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OF TEMP.			
REVISION			
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CHAPTER 76

ENGINE CONTROLS

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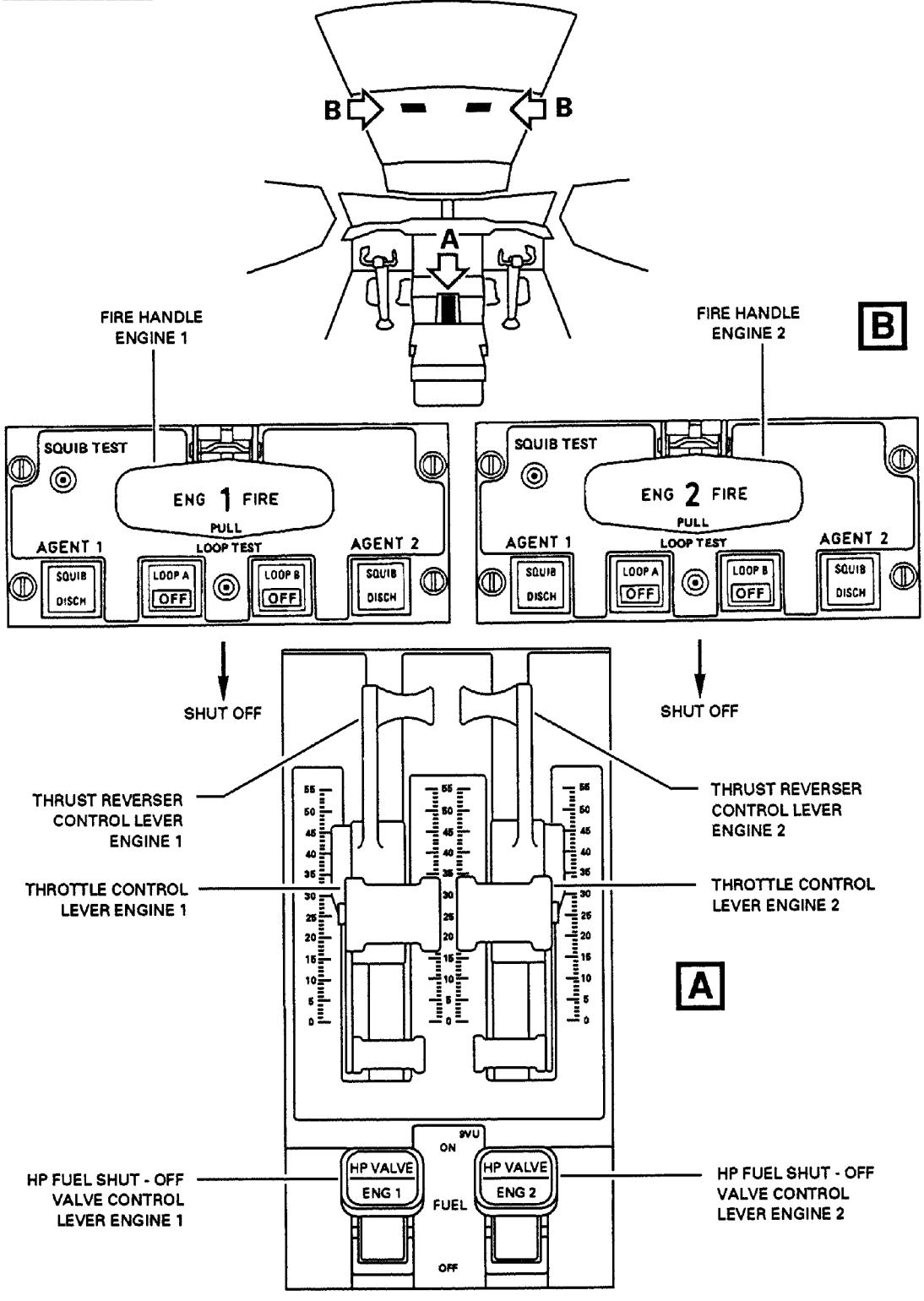
ENGINE CONTROLS - GENERAL - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 002)
(Ref. Fig. 001)
The engine controls consist of :
- the throttle control lever, including the thrust reverser control
- HP fuel shut-off valve control lever
- the LP fuel shut-off valve control : included in the functions of the fire handle lever
- the ENG MODE pushbutton switch (part of the ENG panel 429VU).

A. Throttle Control Lever
(Ref. Fig. 003)
The throttle control levers are located on the center pedestal. Each lever is connected :
- to the autothrottle system (ATS) by a system of rods, cables and push-pull cables. Cable tension regulators keep the cable tension constant despite of cable lengths and airframe structure altering with changes in environmental temperature
- to the throttle control unit, one per engine, each unit including 3 resolvers :
  . one for FADEC channel A
  . one for FADEC channel B
  . one for the TCC
  NOTE : Routing of signals to channel A and channel B are segregated in the engine burst area as shown on :
(Ref. Fig. 003)
- to a microswitch unit, providing signals used to control the following systems :
  . thrust reverser
  . spoilers
  . pressurization

B. Fuel Shut-Off Valve Control (Ref. Fig. 004)
One HP fuel shut-off valve control is used to control the position of each the high pressure shut-off valve located on each engine.
Mechanical design is made to prevent inadvertent operation . Two distinct movements are required to move the throttle control lever : the lever must be pulled before being placed in ON or OFF position
In case of engine fire warning, crew attention is drawn to the corresponding HP control lever which comes on red.

C. LP Fuel Shut-Off Valve Control (Ref. Fig. 005)
The fire handle located in the flight compartment overhead panel is used to control the position of the 2 low pressure fuel valve actuators located on the engine fuel feed line in the wing leading edge close to the pylon interface.
The electrical signals to the 2 LP valve actuators are segregated in the engine burst area. In normal configuration, the fire handle is protected from spurious operation by a safety guard.
In addition when the fire handle is pulled, one discrete is provided to



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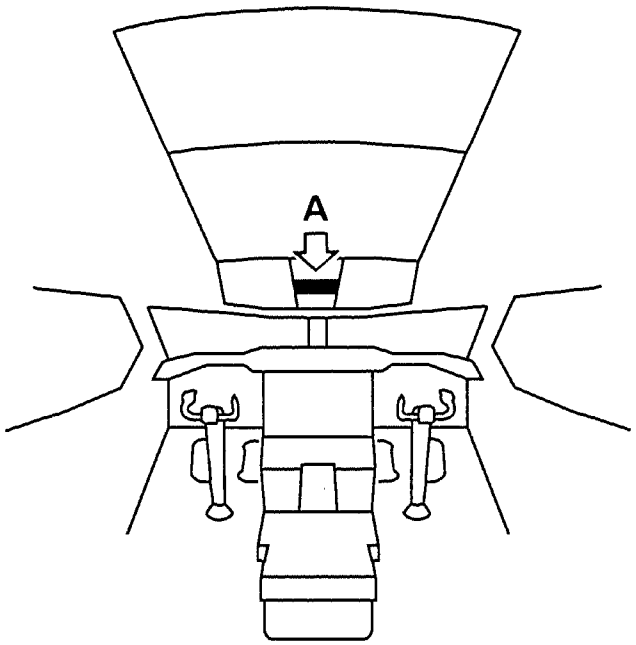
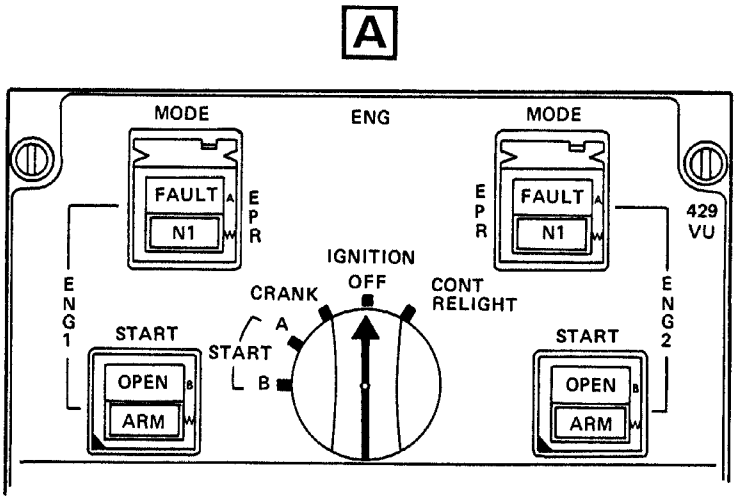
Engine Control in Flight Compartment
Figure 001





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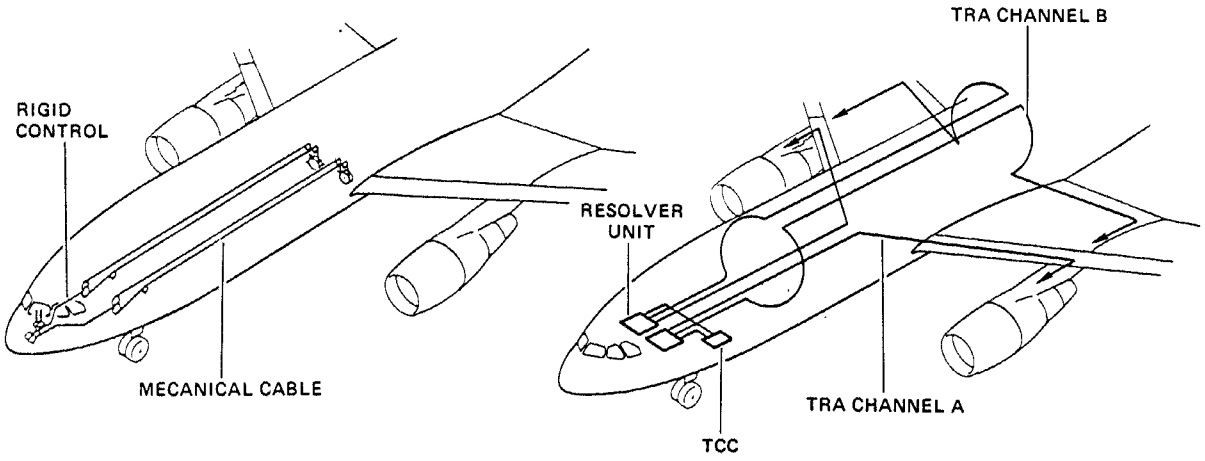
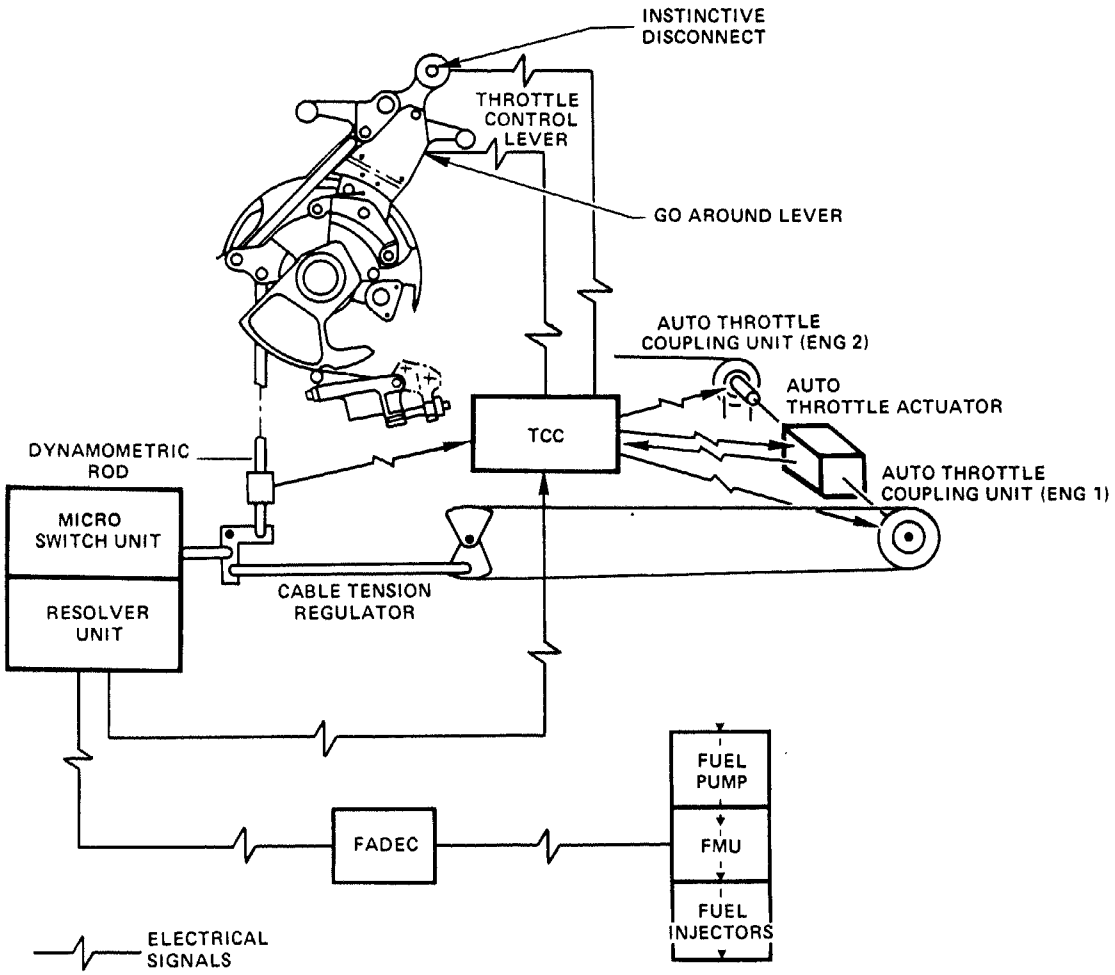
Engine Control in Flight Compartment
Figure 002





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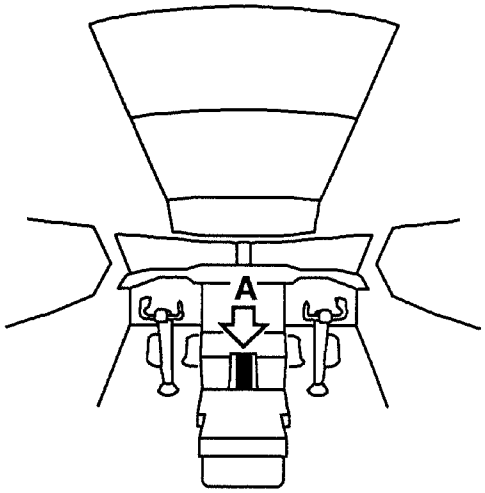
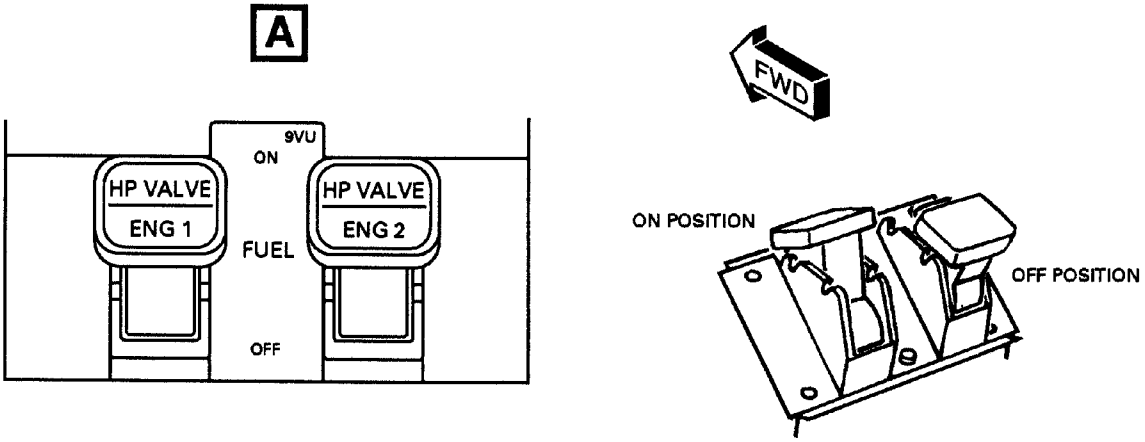
Throttle Control Installation
Figure 003





HP FUEL SHUT OFF VALVE
CONTROL LEVERS

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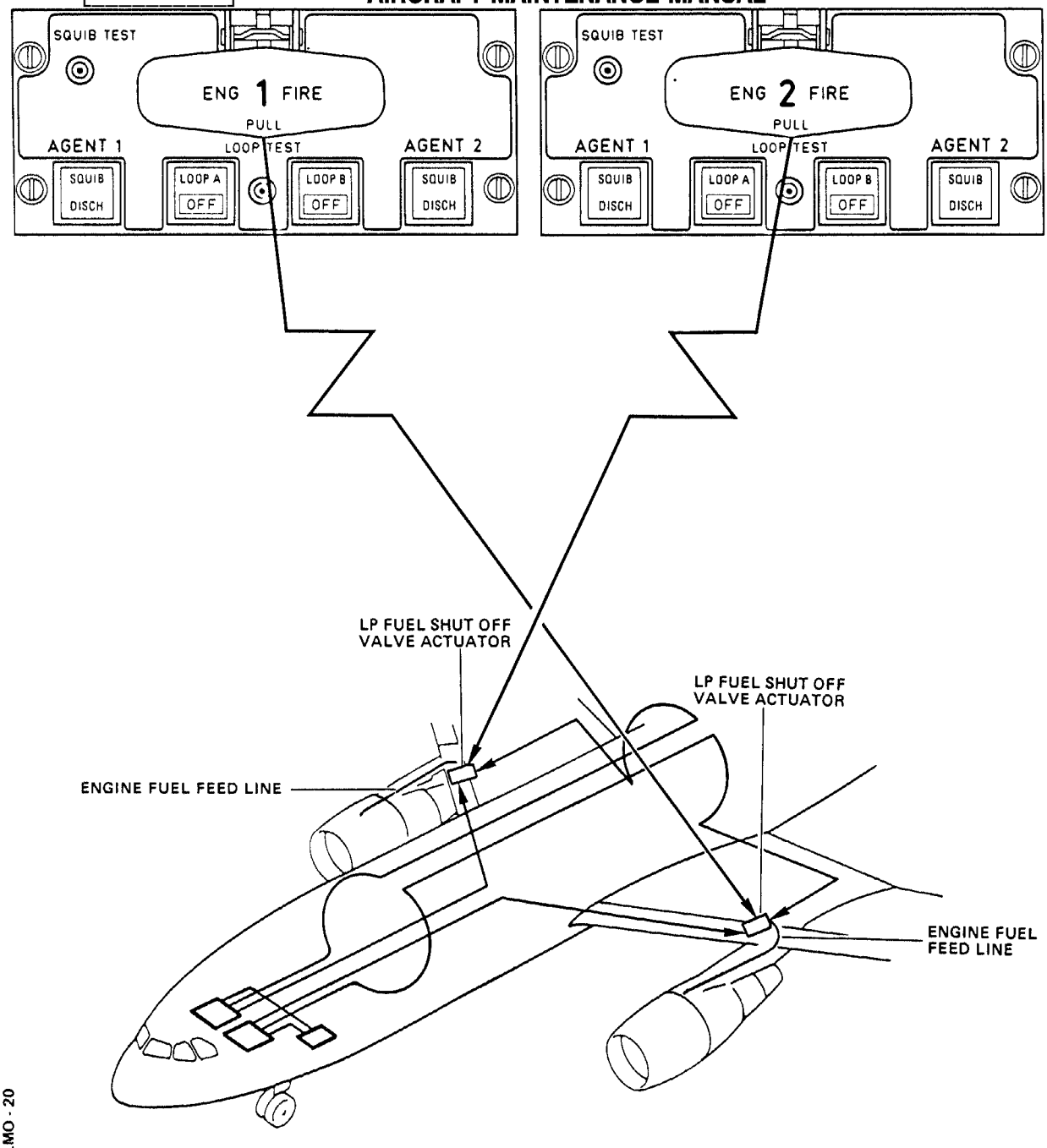
HP Fuel Shut-Off Valve System
Figure 004

each channel of the corresponding engine FADEC to provide the indication that a fire emergency procedure is carried out. In this case the FADEC : (if open).

- closes the engine bleed air and the turbine case cooling system and
- controls the IDG Air/Oil cooler system in the non override configuration to minimize the airflow inside the nacelle (Ref. 73-00-00).



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LP Fuel Shut-Off Valve System
Figure 005

THROTTLE CONTROLS - DESCRIPTION AND OPERATION

1. Power Control

Each engine power is controlled by means of a throttle control lever located in the flight compartment center pedestal.
(Ref. Fig. 001)
Each throttle control lever is connected to :
- the autothrottle system
- the Full Authority Digital Electronic Engine Control (EEC) through the resolver unit
- the microswitch unit

as presented in 76.00, General, Detailed Description and the function of the corresponding above subsystem is shown in the following :

2. General

(Ref. Fig. 002)
The main components of each throttle control system are :
- a throttle control lever
- a dynamometric rod
- a microswitch unit
- 3 throttle lever angle sensing resolvers
- a cable tension regulator
- an autothrottle coupling unit (Ref. 22-00)

The throttle control comprises a mechanical and an electrical part :
- the mechanical part is connected to the autothrottle system
- the electrical part provides a signal corresponding to the throttle control lever position in the different flight phases to :
  . the TCC by means of dynamometric rod
  . the microswitch unit
  . the FADEC (channel A and channel B) and TCC by three resolvers.

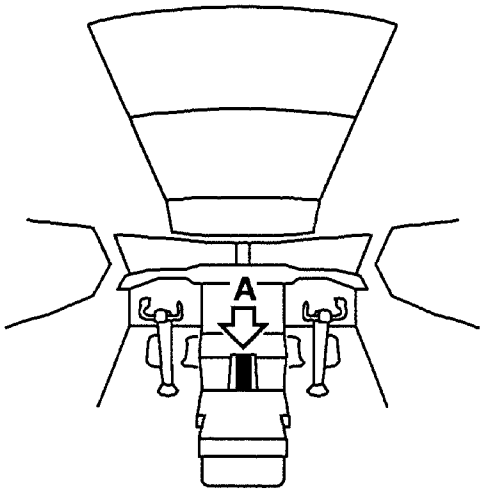
On the throttle control lever are also installed two pushbuttons (one for go around, and the other for autothrottle instinctive disconnection described in 22-00).

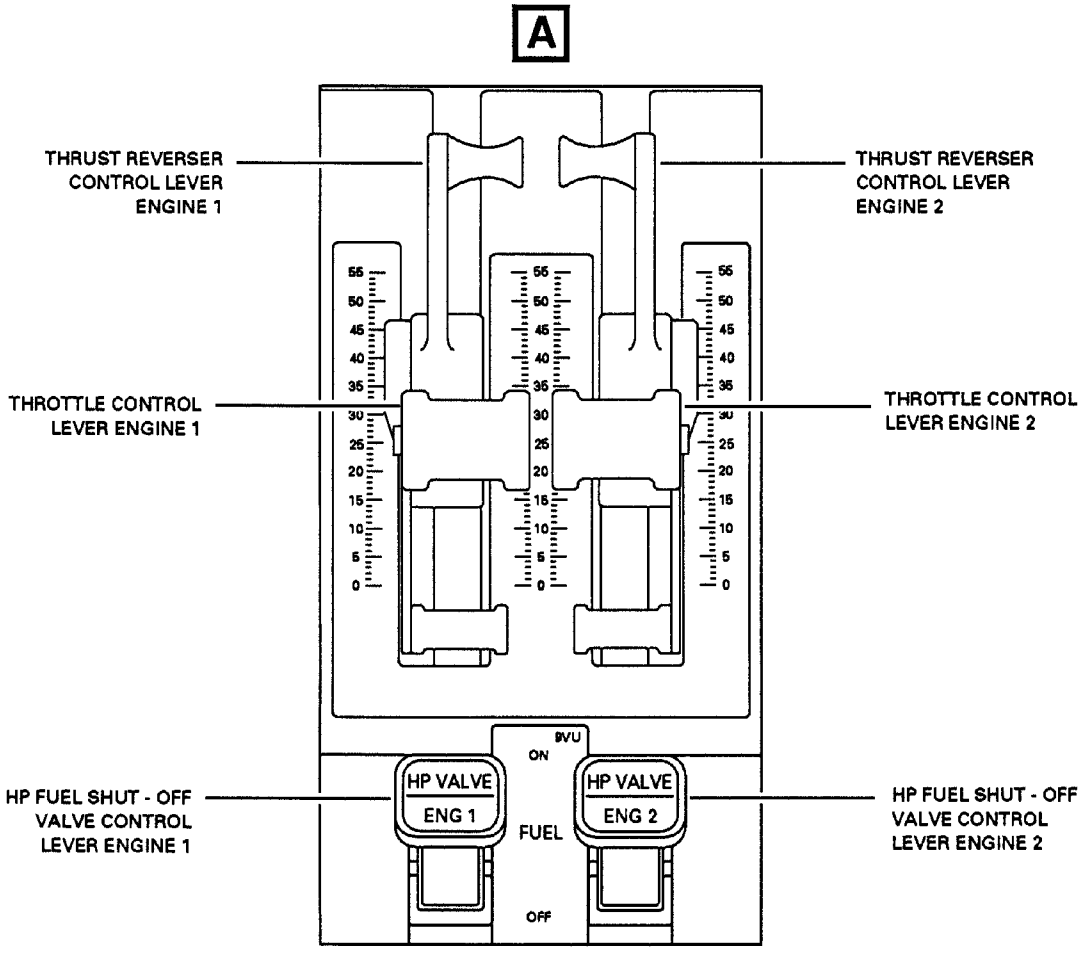
3. Throttle Control Mechanical Parts Description

A. Forward Thrust

(Ref. Fig. 003)
The throttle levers move over a range of 55° TLA between two physical stops :
- the full forward stop (55° TLA) which corresponds to the Max. Take off/Go-around thrust rating
- the full rearward stop (0° TLA) which corresponds to the Idle setting.

The throttle control levers are pivot-mounted on the center pedestal 9VU.
Each handle is made up of :
- a throttle control lever
- an autothrottle instinctive disconnect microswitch (Ref. 22-30).
- a go-around lever (Ref. 22-30)
- a rocker arm with two rollers
- a fixed sector
- a thrust reverser control lever





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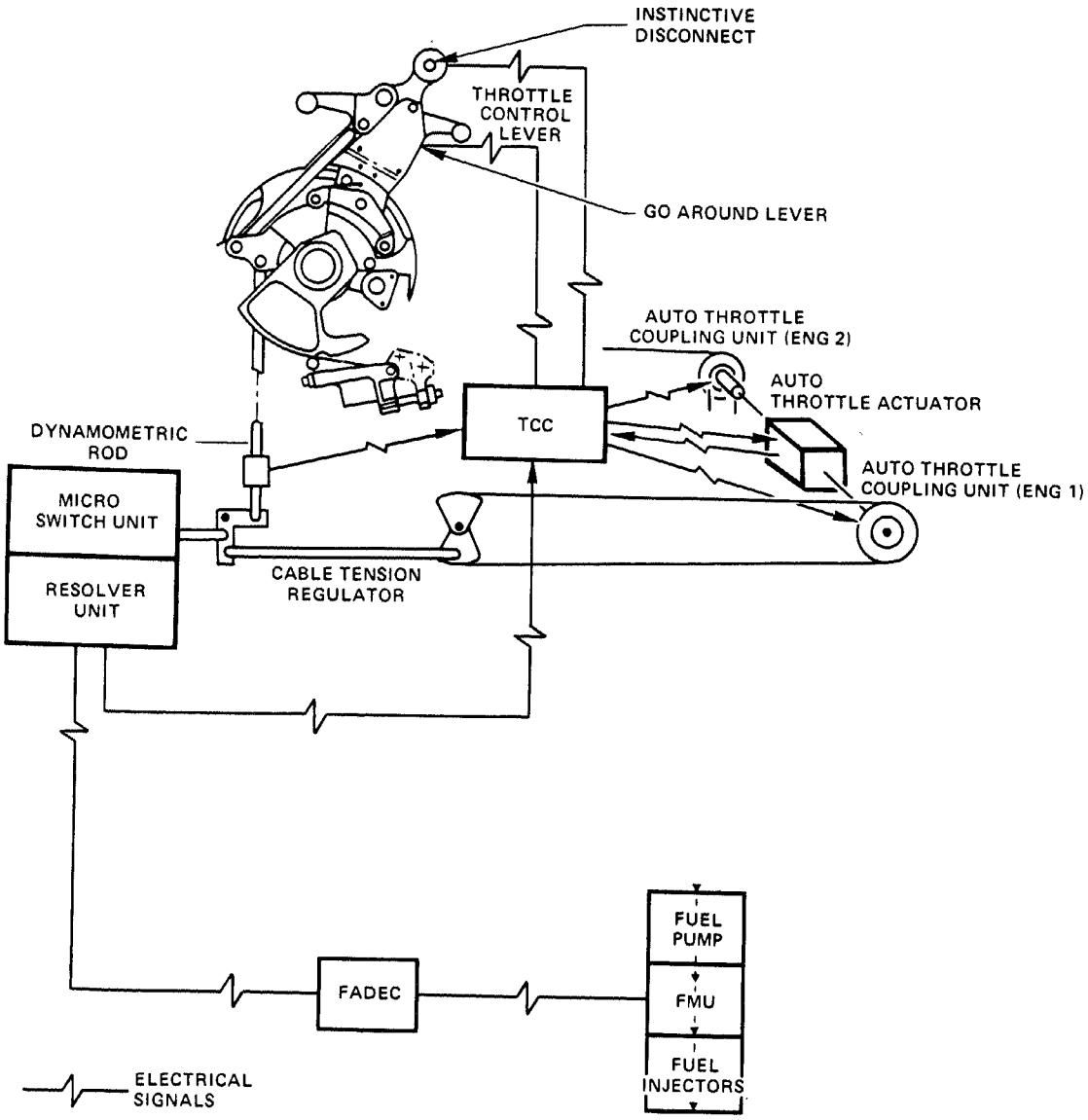
Power Control Location
Figure 001



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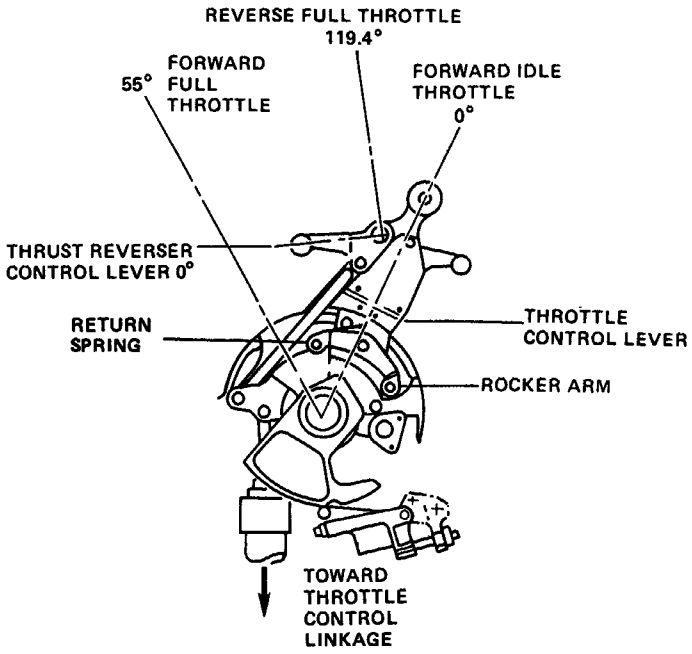
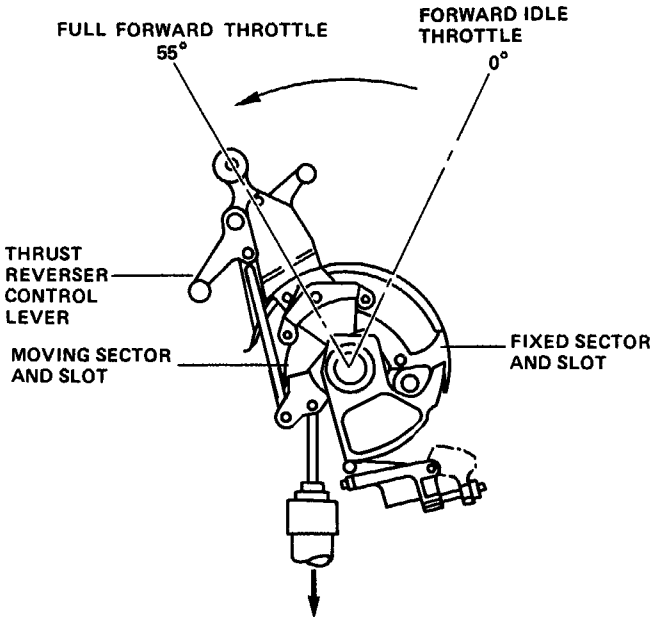
Power Control System
Figure 002



NORMAL IDLE THROTTLE POSITION



FULL FORWARD THROTTLE POSITION

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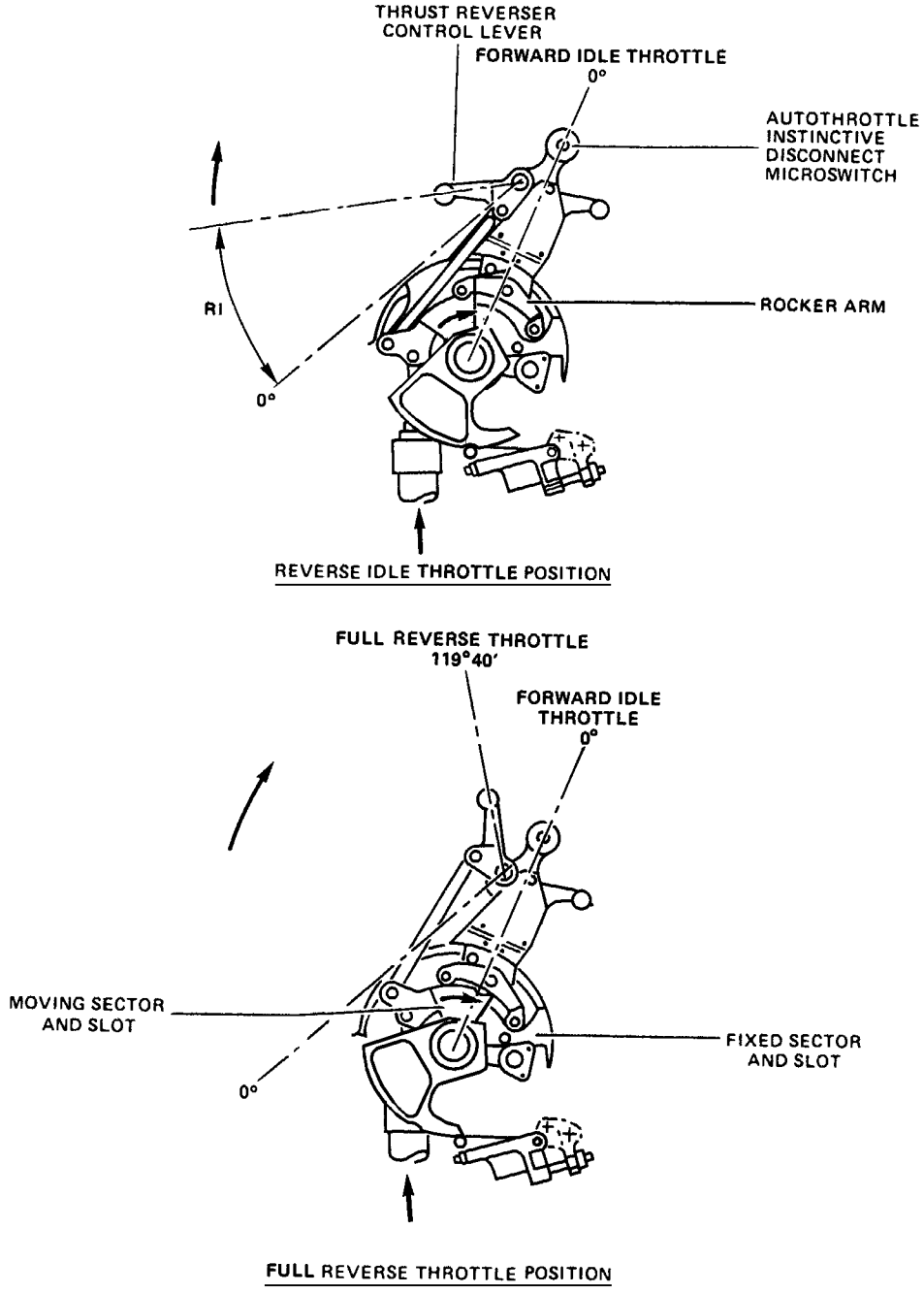
Throttle Control Lever Forward Thrust
Figure 003

In the idle position the rocker arm forward roller is held in the moving sector detent by a return spring. The throttle control lever may be moved toward the forward full-throttle position (55°).
Movement of the throttle control lever forward rotates the moving sector via the rocker arm forward roller. The aft roller moves along the cam face of the fixed sector, positively locking the thrust reverser control lever when the throttle control lever is not at the idle position.

B. Thrust Reverser
(Ref. Fig. 004)
The thrust reverser control lever cannot be moved unless the throttle control lever is in the idle position. Movement of the thrust reverser control lever rotates the moving sector via the connecting rod.
The rocker arm pivots and the aft roller is locked in the detent in the fixed sector, locking the forward thrust control lever in the idle position.
The position of each of the two thrust reverser sleeves is sensed by a dual coil rotational variable differential transfromer(RVDT-see ATA 78-31 and input directly to the FADEC).
This information is used :
- to prevent application of engine power above idle until thrust reverser sleeves reach the commanded position or in case of inadvertent deployment
- to modulate the thrust as a function of the sleeve position and reverser lever angle in the end of the sleeve stroke (at deployed or stowed positions : (Ref 78-00).

A "hard point" is introduced in the throttle linkage which makes the crew feel the reverser idle position. From this point, if the lever is pulled, the reverse thrust is applied and if the lever is pushed the reverser is stowed. This hard point is set at 45 ± 3° RLA (31.4 ± 0.8° TRA).

C. Cable Tension Regulator (Ref. Fig. 005)
The cable tension regulator maintains constant tension of the cable irrespective of the variations in ambient temperature.
Cold compensation
At low temperature, the structure contracts more than the cables, tending to reduce the cable tension.
The springs expand and the locking crossbeam slides along the locking rod. Links from the locking crossbeam rotate the quadrants, restoring normal cable tension.
Hot compensation
At high temperature, the structure expands more than the cables, tending to increase the cable tension. This increase in tension rotates the two quadrants, the locking crossbeam slides and compresses the springs, thus restoring normal cable tension.
Normal Operation
Movement of the throttle control lever acts on the cable tension regulator hub through the linkage, thus rotating the two quadrants and locking the crossbeam on the locking rod. The cable tension regulator has then the same function as a pulley.



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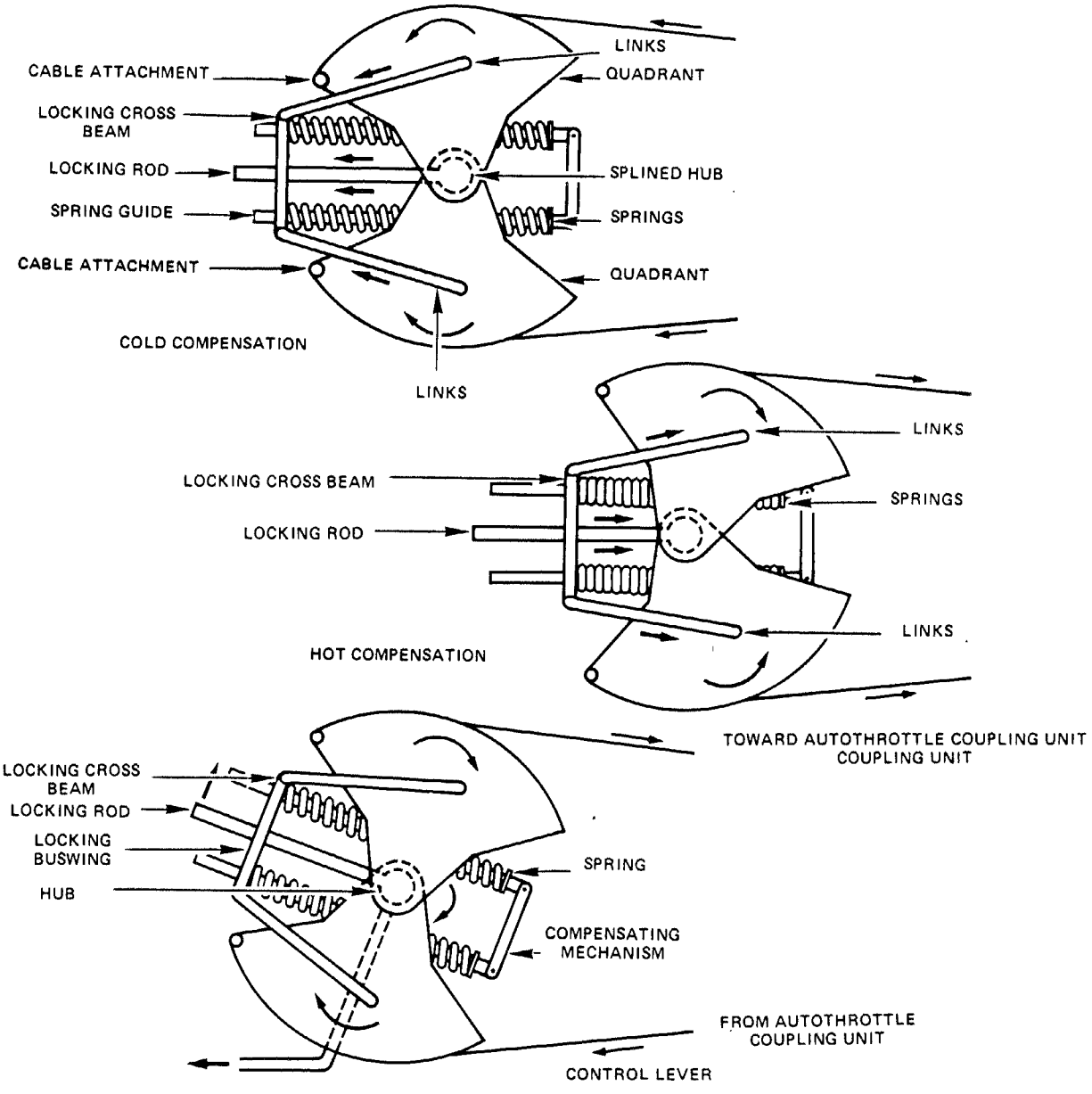
Throttle Control Lever - Thrust Reverser
Figure 004



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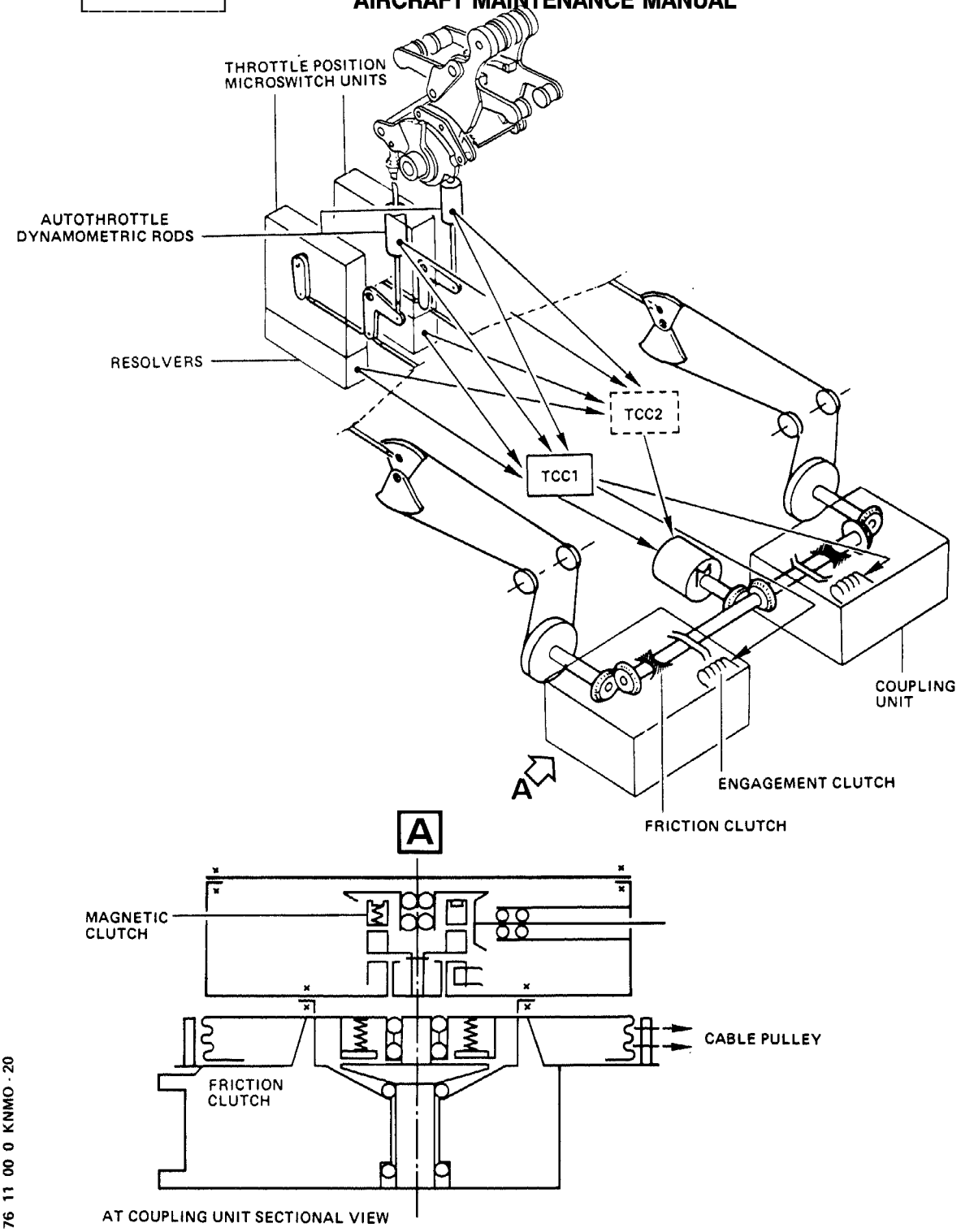
Throttle Control - Cable Tension Regulator
Figure 005

D. Autothrottle Coupling Units (Ref. Fig. 006)
(Ref. Fig. 006)
The autothrottle system is under the command of the TCC (Ref. 22-00). Automatic corrections of the selected power level are effected mechanically by the auto-throttle servo motor, when the TCC has been armed and with either SPEED or THRUST mode engaged.
A single DC servo motor drives the cable and pulley which connects the TLA's with the PLA's via a reduction gearbox and drive coupling units.
The coupling units (one per engine) feature friction and electro-magnetic clutches.
Drive engagement is effected via the electro-magnetic clutches. The friction clutches are provided for mechanical safety in the case of an over-torque occurring.
With either SPEED or THRUST mode engaged, any force input on the throttle control levers by the pilot will act against the Auto Throttle correction system torque and the dynamometric rod(s) will signal the situation to both TCC's.
A similar signal to the TCC is also provided in case the instinctive disconnect pushbutton is pressed.
In turn the TCC's will command the electro magnetic clutches to open for as long as the dynamometric rods remain compressed.

E. Friction Unit

4. Throttle Control Electrical Components
(Ref. Fig. 007)
The electrical components of each throttle control lever consist of :
- two microswitches located on the throttle control lever (instinctive disconnect and go around controls)
- the dynamometric rod electrical unit
- the microswitch unit
- the throttle position detector (resolver unit) which transmits the throttle control lever position to both FADEC channels and to the TCC.

A. Dynamometric Rods
(Ref. Fig. 008)
The throttle control levers are connected to their respective rod-and-cable control linkages by dynamometric rods.
The function of the dynamometric rod is to sense the level of force exerted by the pilot in moving the complete throttle system against the forces of the autothrottle actuator system, (when engaged), and to transmit their force signal to the TCC's.
Basically, the dynamometric rod consists of a hollow tube containing a coiled compression spring, the deflection of which is measured by a miniature rotary potentiometer. When the compression of the spring reaches and exceeds a set level, the auto throttle actuator clutches are signalled to open by the TCC thus permitting easy re-setting of the throttle control lever position without having to disengage the complete auto-throttle system. Once the pilot's input force is released, the auto-throttle actuator clutches automatically re-engage.



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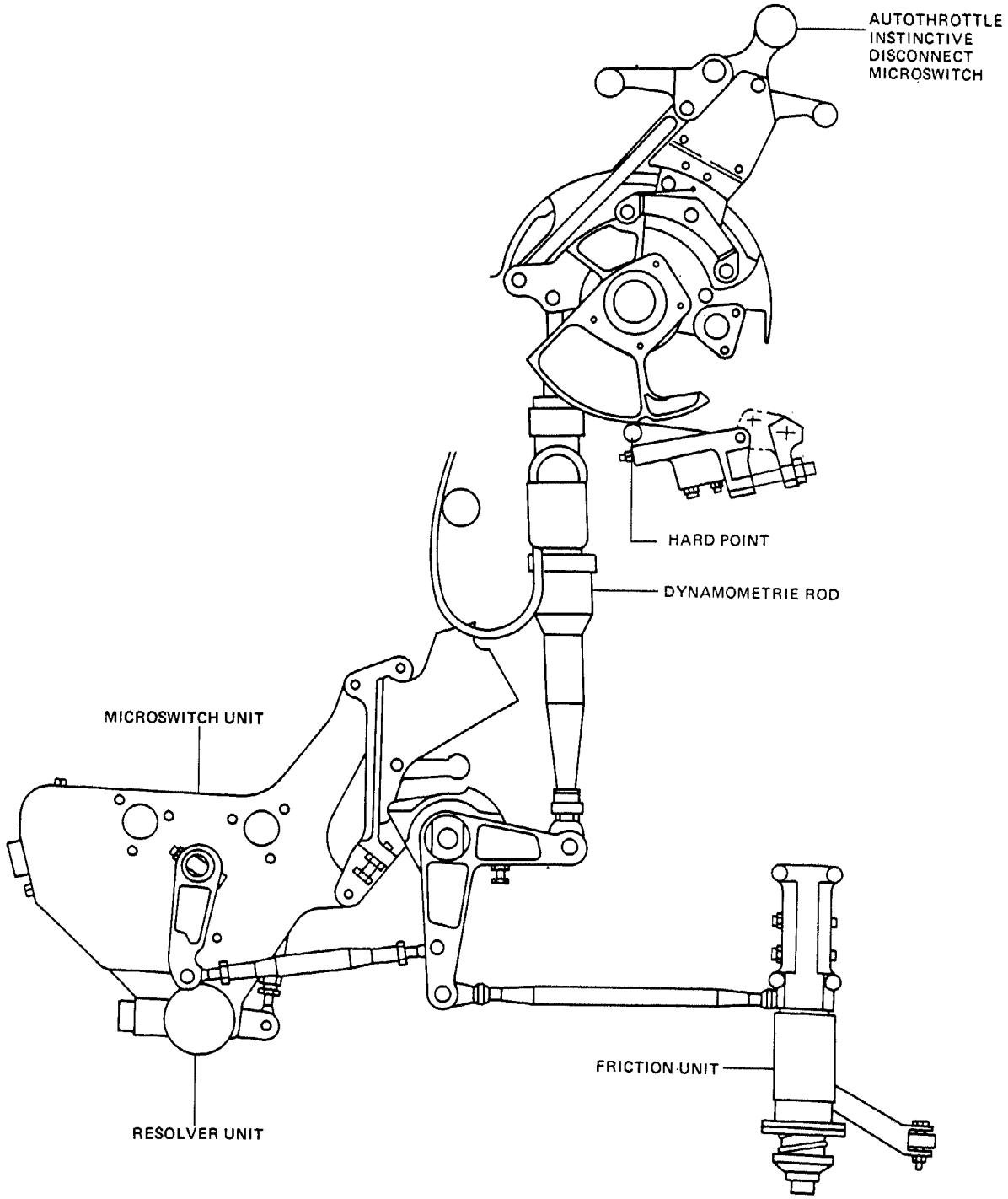
Autothrottle Coupling Unit Location
Figure 006



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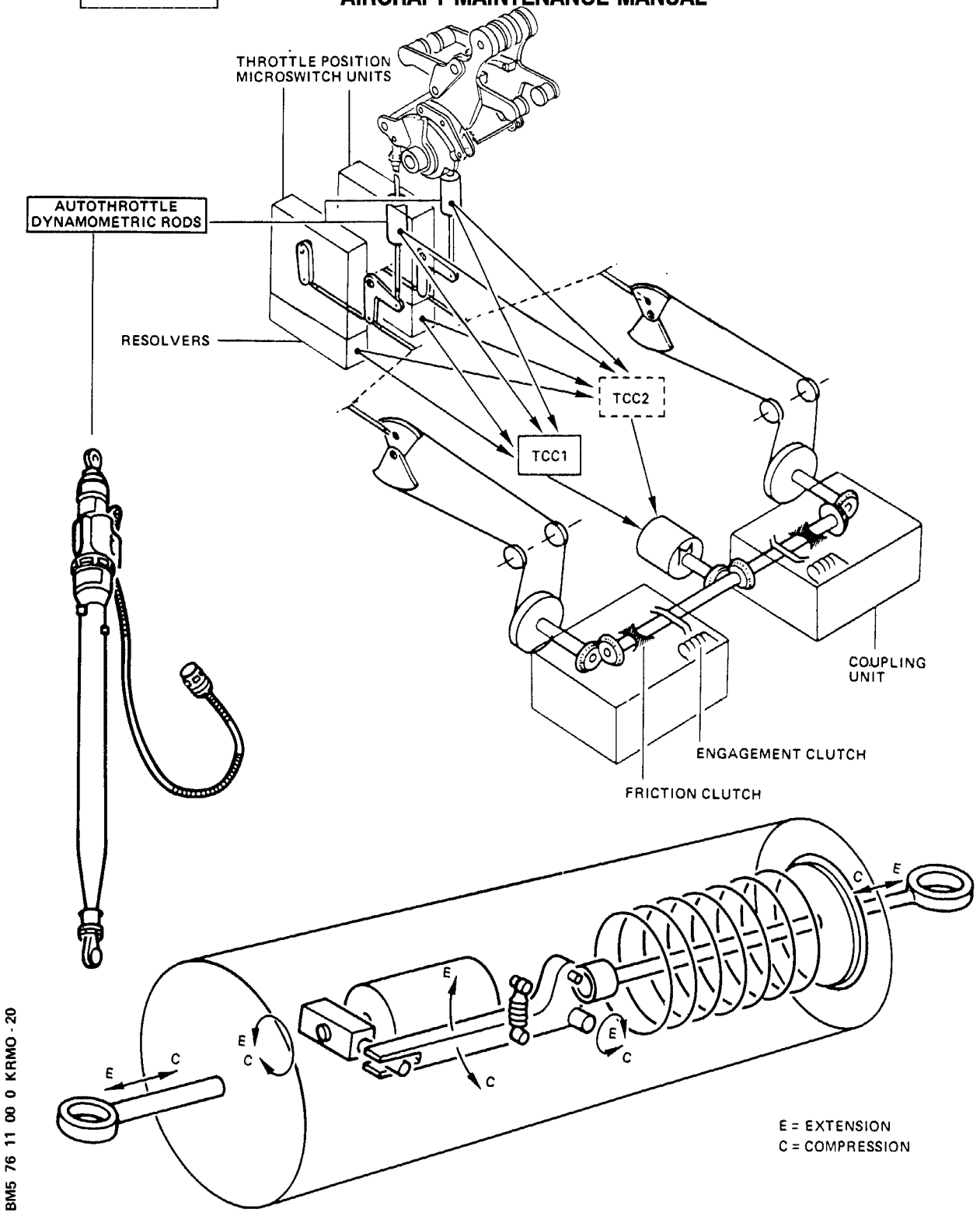
Throttle Control Lever System
Figure 007



Autothrottle Dynamometric Rods
Figure 008

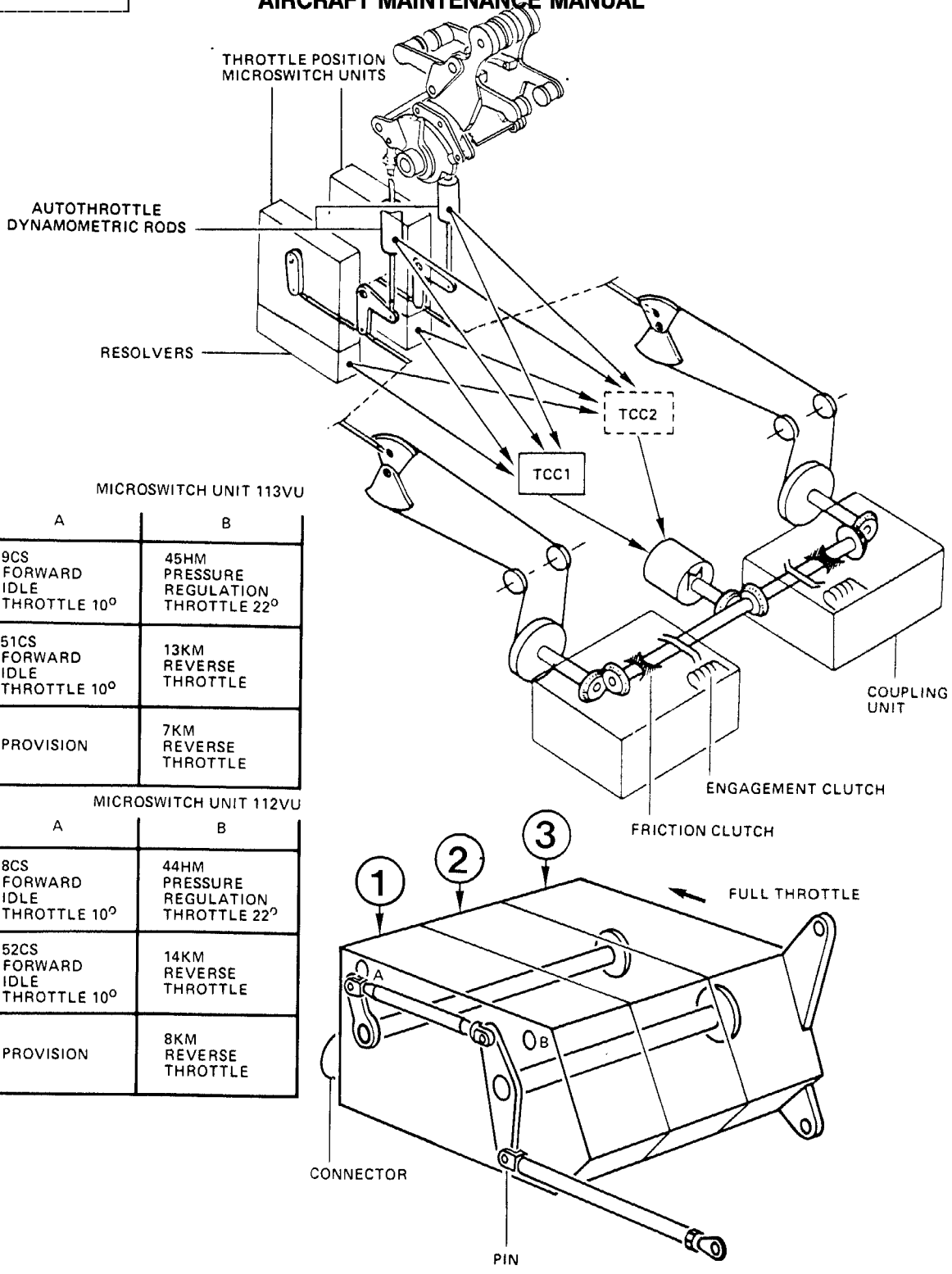
B. Microswitch Unit
(Ref. Fig. 009)
Each throttle control lever acts upon the contacts of microswitch unit (112VU on the RH SIDE and 113VU on the LH side) used to detect the position of the throttle control lever in the different flight phases.
The microswitch units are located in the center pedestal, under the flight compartment floor.
Each microswitch unit consists of five microswitches :
- 113VU (9CS, 51CS, 45HM, 13KM, 7KM)
- 112VU (8CS, 52CS, 44HM, 14KM, 8KM)

(1)Microswitches 9CS, 51CS (8CS, 52CS).
When these two microswitches are activated below 10° throttle control lever, the spoilers may be extended.

(2)Microswitch 45HM (44HM)
On the ground :
- when one throttle control lever reaches 22° increasing and that one of the LH or RH microswitch is activated, the cabin may be pressurized at take off.
- when both throttle control levers reach 22° decreasing and that both LH and RH microswitches are activated, the cabin may be depressurized at landing (opening of the four outflow valves).

(a)Microswitches 13KM, 7KM (14KM, 8KM)
Thrust reverser control
On the ground, thrust reverser control lever microswitch 13KM (14KM) and 7KM (8KM) activation respectively enable energization of the directional pilot valve solenoid, activation of the arming solenoid and opening of the HP bleed control valve and pressure regulating and shut off valve. The air is then supplied to pneumatic drive motor operating the ballscrew actuators in deployed direction.
The air supply is then maintained for reverse operation by closure of the stow switches until the thrust reverser is again in stowed position.
Thrust reverser control lever microswitches are set such that :
- the deploy command occurs before 41° RLA
- the stow command occurs between 28.5 and 20.5 RLA.

C. Resolver Unit (Ref. Fig. 012, 013)
(Ref. Fig. 010)
(Ref. Fig. 011)
The angular position of each throttle control lever is sensed by three resolvers included in the associate resolver unit.
These throttle position detectors are mounted on the same shaft below the microswitch units.
One resolver provides a signal to the TCC, the two other resolvers to the corresponding FADEC (channel A and channel B).
Electrical power for the TCC-linked resolver is supplied from the aircraft system (26V 400Hz). (Ref. 73-00)
Engine control resolver excitations are supplied directly by the FADEC (Ref. 73-00).
From the resolver unit to the corresponding FADEC, the wiring is segregated between the two channels :



MICROSWITCH UNIT 113VU

	A	B
1	9CS FORWARD IDLE THROTTLE 10°	45HM PRESSURE REGULATION THROTTLE 22°
2	51CS FORWARD IDLE THROTTLE 10°	13KM REVERSE THROTTLE
3	PROVISION	7KM REVERSE THROTTLE

MICROSWITCH UNIT 112VU

	A	B
1	8CS FORWARD IDLE THROTTLE 10°	44HM PRESSURE REGULATION THROTTLE 22°
2	52CS FORWARD IDLE THROTTLE 10°	14KM REVERSE THROTTLE
3	PROVISION	8KM REVERSE THROTTLE

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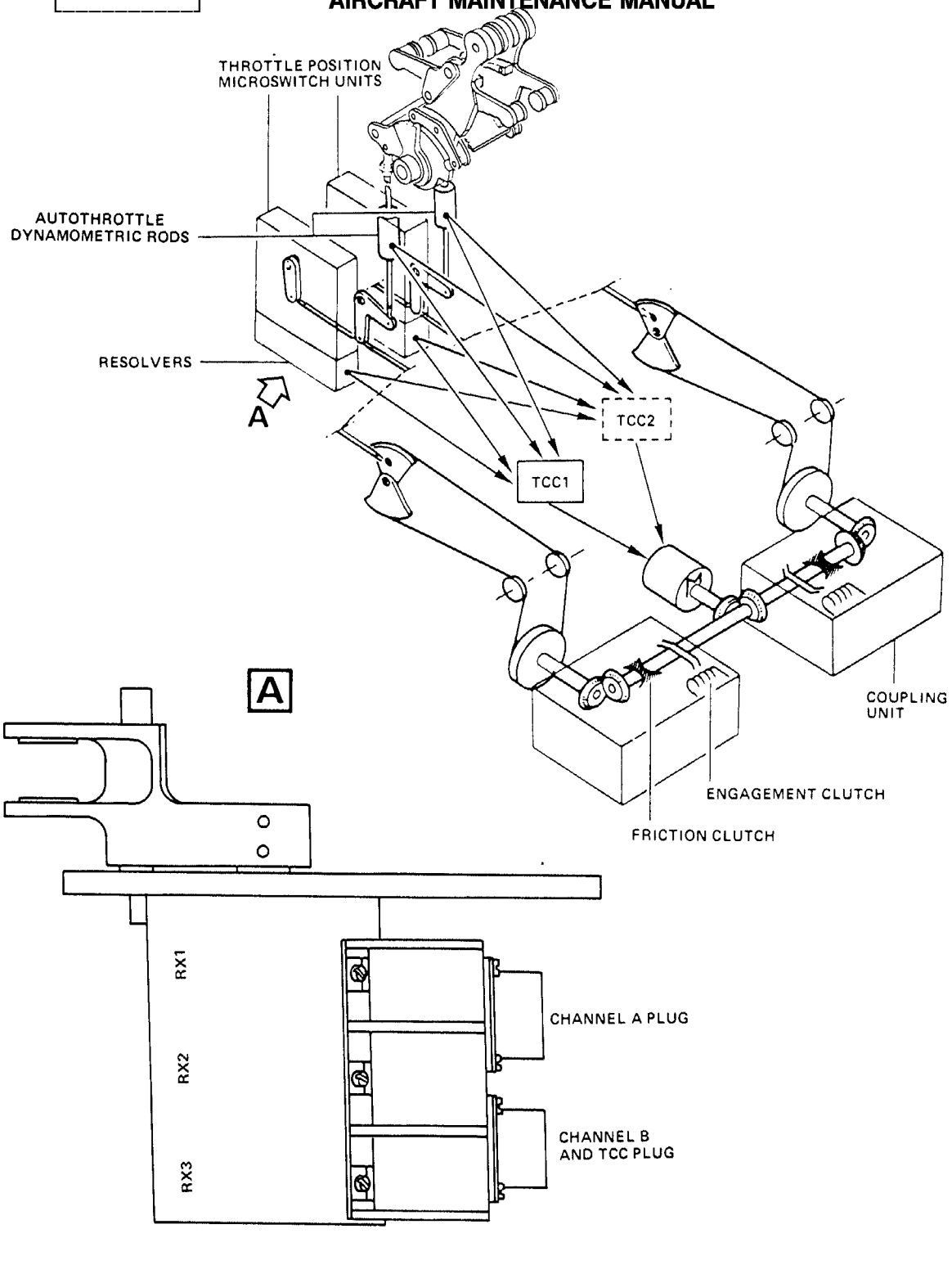
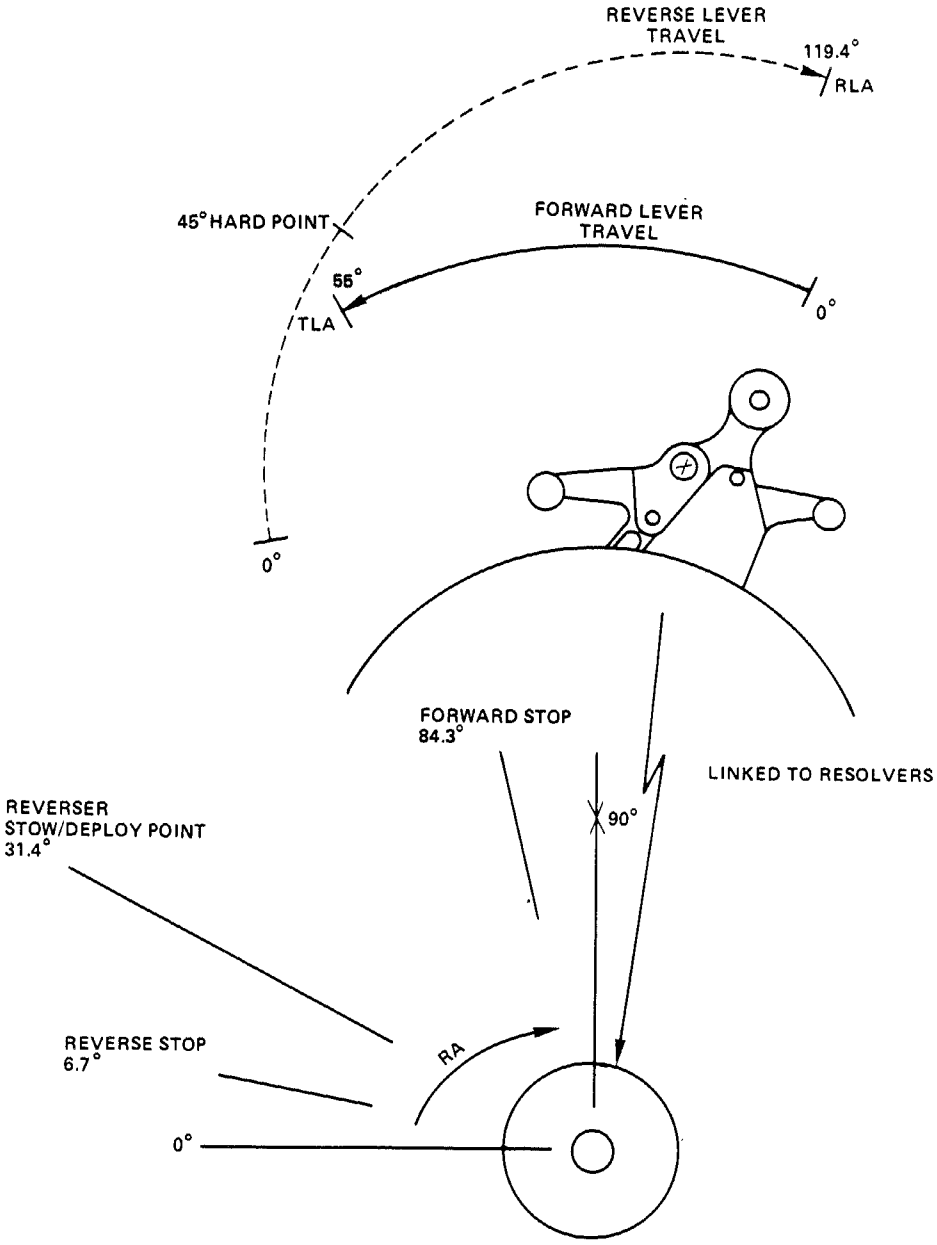
Microswitch Units
Figure 009



Resolver
Figure 010



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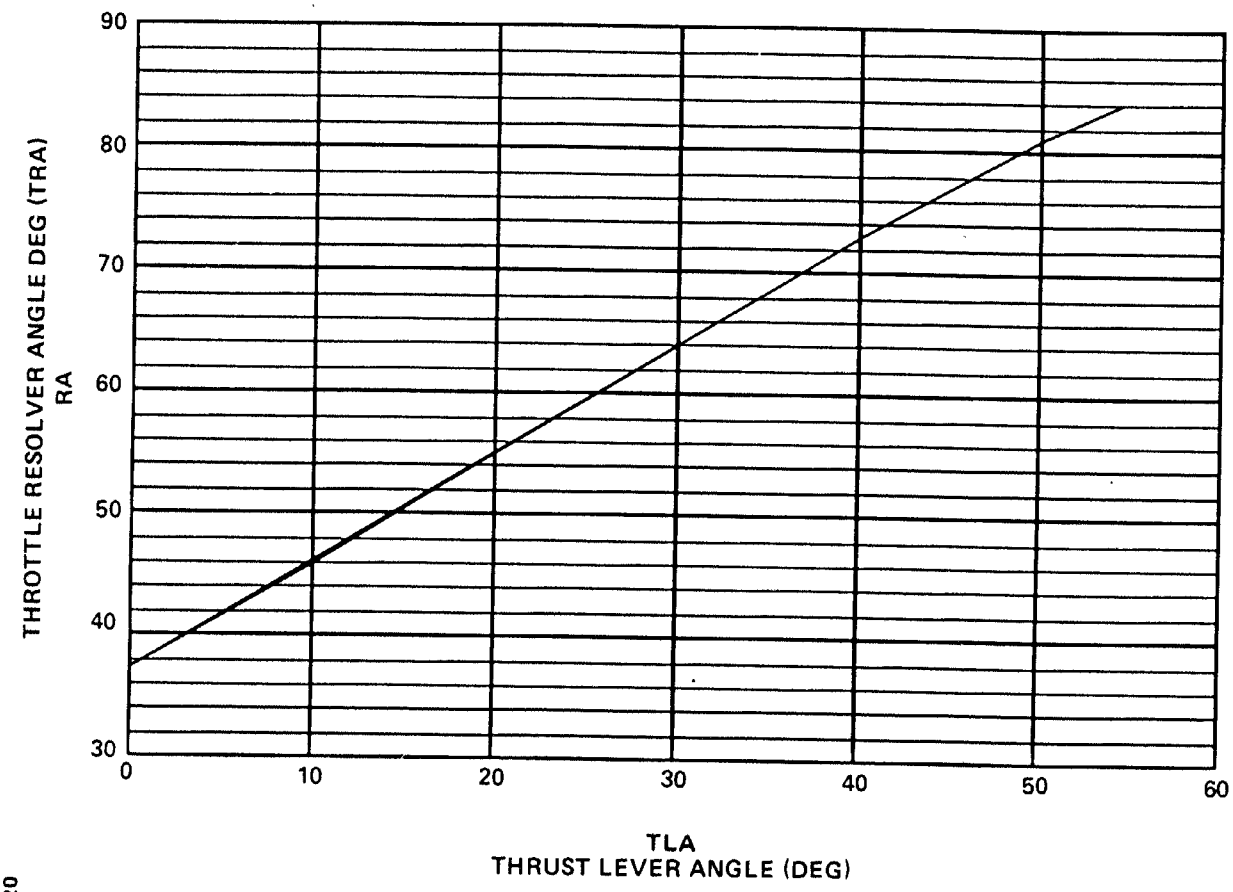
Resolver
Figure 011

- different connectors on the resolver unit
- different wiring routes in the aiframe with special care in the burst area
- different connectors in the **FADEC.**



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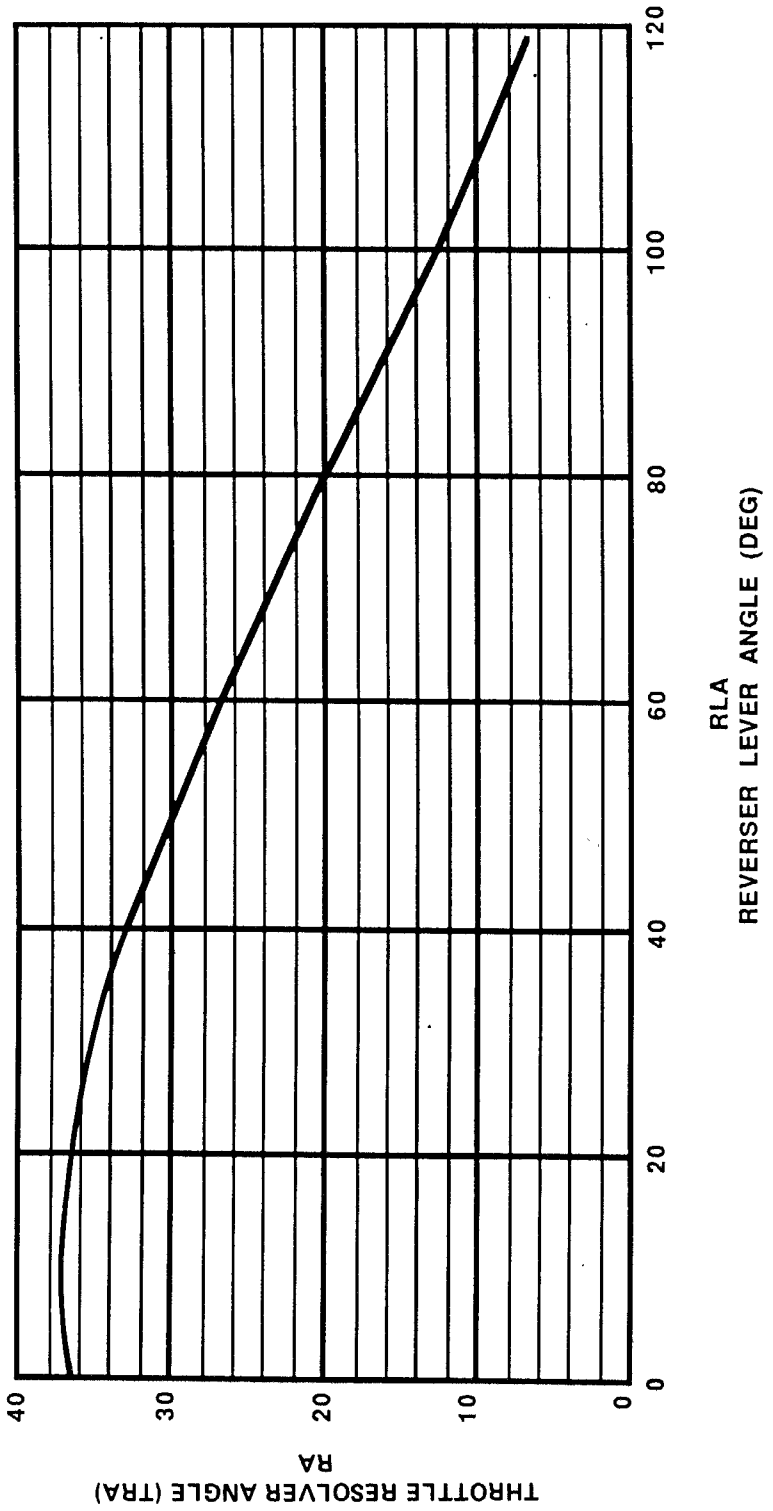
Resolver Angle VS. Thrust Lever Angle
Figure 012



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Resolver Angle VS. Reverser Lever Angle
Figure 013

1. Check of Throttle Control Movement

A. General

These procedures give the detailed instructions necessary to perform the corrective actions applicable in case of hard throttle control movement noted (Ref. TSM 76-00-40).

B. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Corrosion Resistant Steel Lockwire Dia. 0.032 in. (0.813 mm)
C.	Cotter pin
D. 97A76102003000	Adapter - Spring Scale
E. 97A27902016000	Spring Scale Assy
Referenced Procedures - 76-11-00, P. Block 501	Throttle Control

WARNING : BEFORE ATTEMPTING ANY MAINTENANCE OPERATION ON THE THROTTLE CONTROLS, OPEN, SAFETY AND TAG THE APPROPRIATE CIRCUIT BREAKERS.

C. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SYS1/28VDC	306CJ1	102/H 8
21VU	AFS/TCC/SYS1/115VAC	308CJ1	102/H 9
21VU	AFS/TCC/SENSORS	305CJ1	102/H10
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1 & 2/START/CTL & WARN	1KG	335/R68

(2)In avionics compartment, open the access door 121BL.

D. Disconnect the Lower Attachment of Dynamometric Rod 32CJ (34CJ) (Ref. Fig. 201)

(1)Check that the throttle control lever and the thrust reverser control lever are in FIT position.
(2)Remove and discard the cotter pin (5).
(3)Remove nut (6) together with washer (4) and retain them.
(4)Move the thrust reverser control lever in RFT position.
(5)Remove bolt (1) together with spacer (2).
(6)Disconnect the dynamometric rod from yoke fitting (3).

(7)Move the thrust reverser control lever in FIT position.

E. Connect the Lower Attachment of Dynamometric Rod 32CJ (34CJ)
(Ref. Fig. 201)
(1)Move the thrust reverser control lever in RFT position.
(2)Engage the dynamometric rod into the yoke fitting (3).
(3)Install the spacer (2) with bolt (1).
(4)Move the thrust reverser control lever in FIT position.
(5)Install the washer (4).
(6)Install and tighten the nut (6).
(7)Safety with a new cotter pin (5).

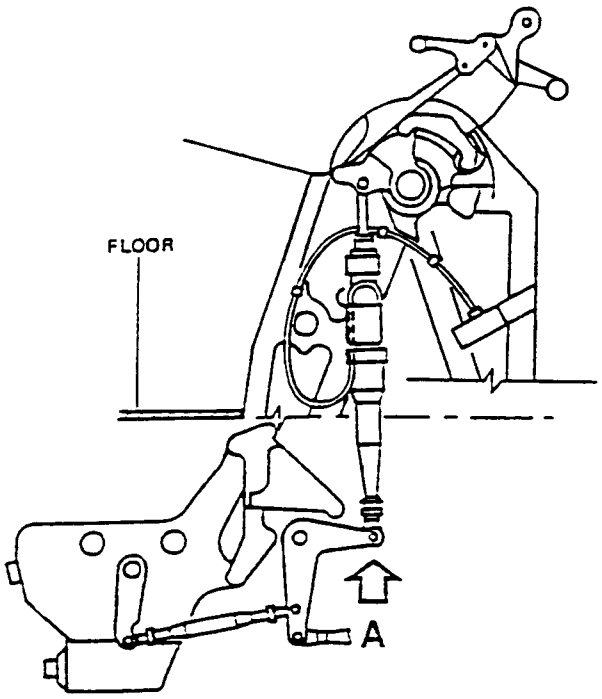
F. Disconnect the Link Rod Located upstream the Cable Tension Regulator
(Ref. Fig. 202)
(1)Remove and discard the cotter pin (5).
(2)Remove the bolt (1), the washer (3) and the nut (4).
(3)Pivot the lever (6) to disconnect the rod (2).
(4)Carry out a complete cycle of the throttle control looking for binding or friction point.

G. Disconnect the Microswitch Unit Link Rod (Ref. Fig. 203)
(1)Remove and discard the cotter pin (3).
(2)Remove the bolt (4), the washer (1) and the nut (2) then disconnect the end of link rod (5).
(3)Carry out a complete cycle of the throttle control to check for binding or friction point.

H. Connect the Link Rod Located upstream the Cable Tension Regulator
(1)Engage the link rod (2) into the lever (6).
(2)Install the bolt (1), the washer (3) and the nut (4).
(3)Tighten the bolt and safety with a new cotter pin (5).

I. Connect the Microswitch Unit Link Rod (Ref. Fig. 203)
(1)Engage the link rod into the yoke fitting.
(2)Install the bolt (4), the washer (1) and the nut (2).
(3)Tighten the bolt and safety with a new cotter pin (3).

J. Close-Up
(1)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(2)In the avionics compartment, close the access door 121BL.
(3)Check of throttle control effort (Ref. 76-11-00, P. Block 501).
(4)Make certain that the throttle control levers and the thrust reverser control levers are in FIT position.
(5)Remove safety clips and tags, and close circuit breakers 308CJ1, 306CJ1, 305CJ1, 1JH, 2JH, 8JH, 1KG, 1KM and 2KM.



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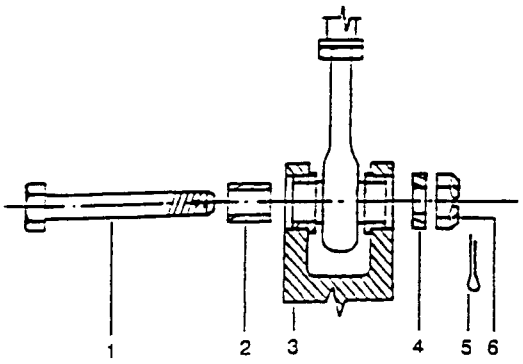

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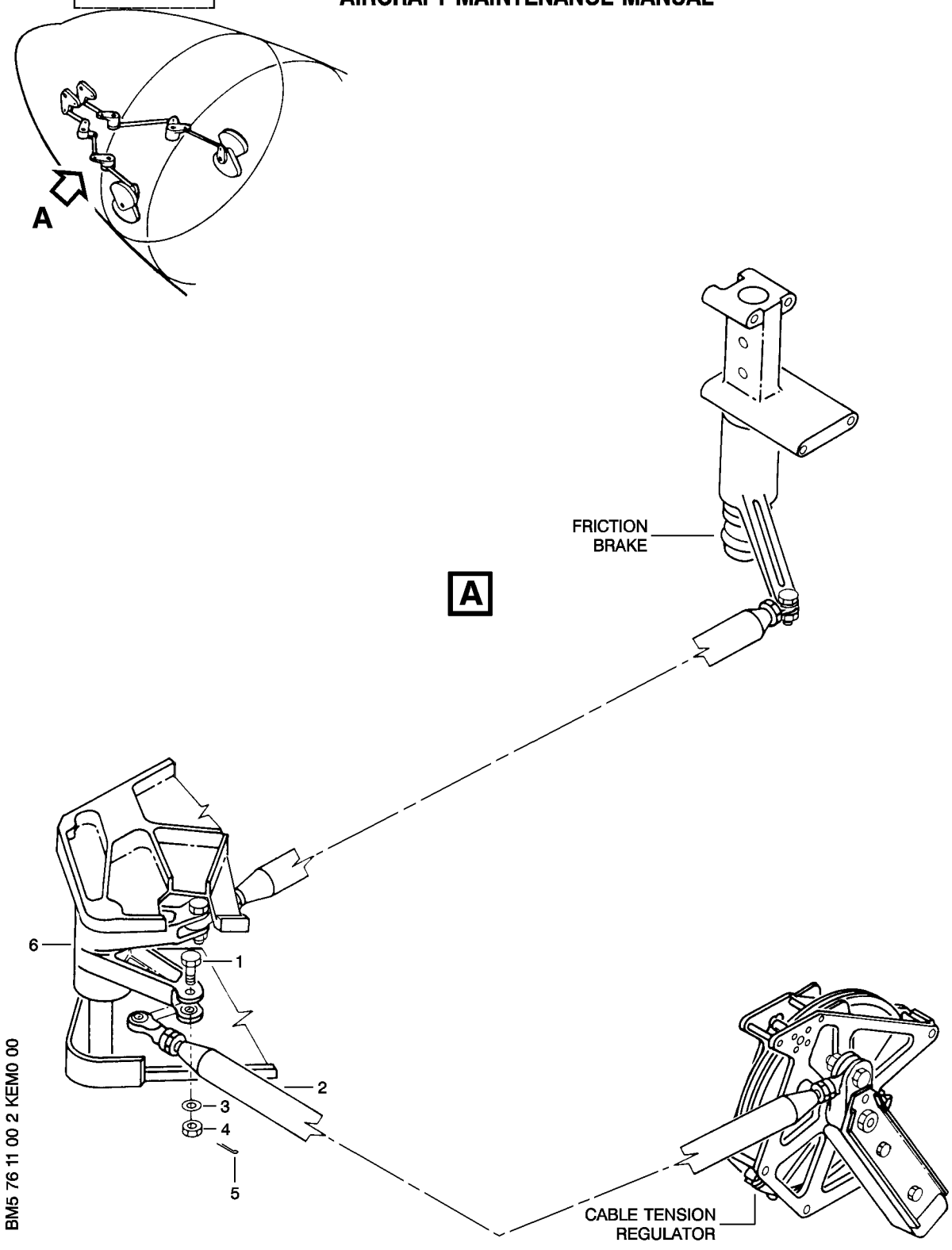
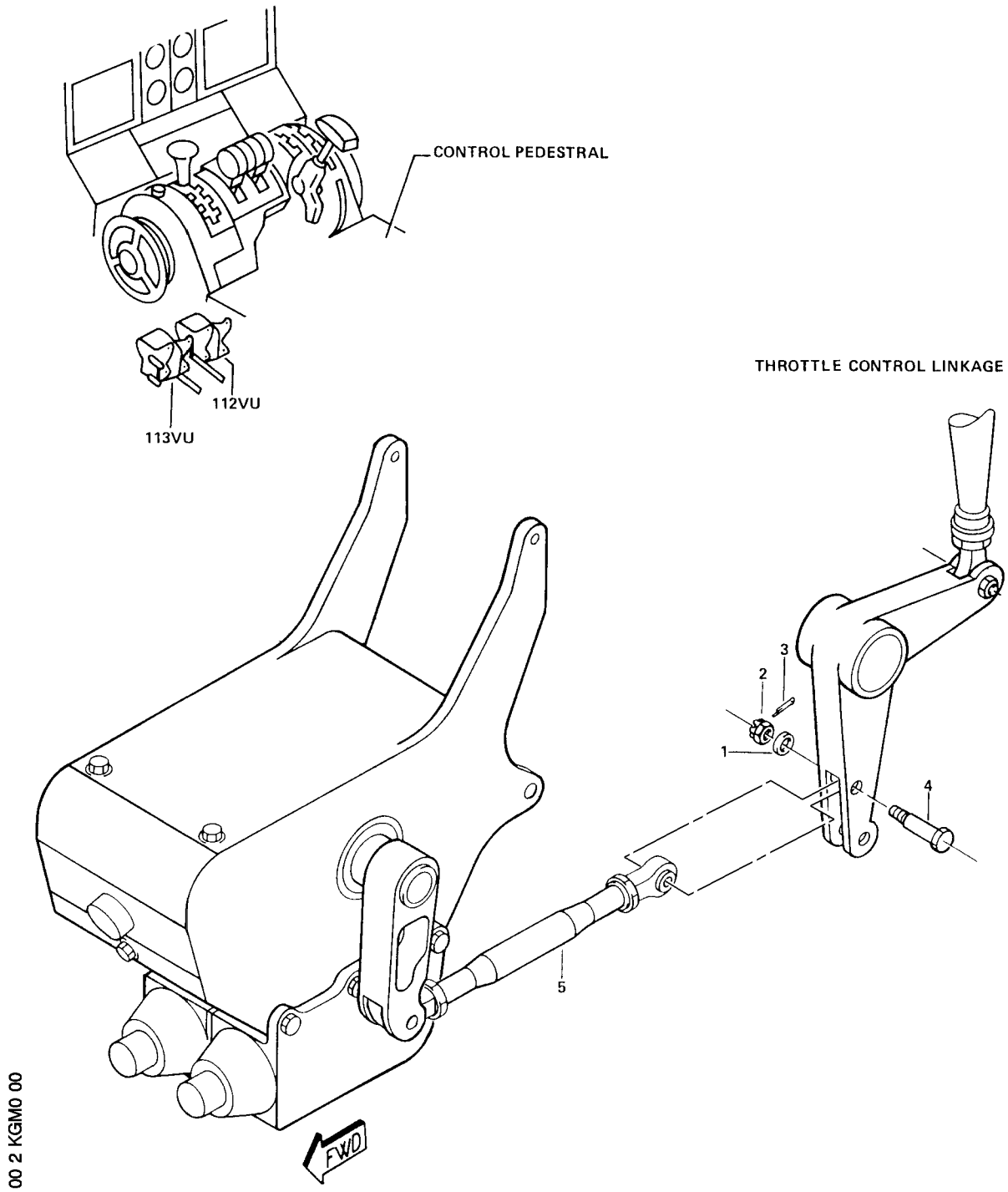
Dynamometric Rod Disconnection
Figure 201



Cable Tension Regulator Disconnection
Figure 202



Microswitch Unit Disconnection
Figure 203

THROTTLE CONTROLS - REMOVAL/INSTALLATION

NOTE : Removal/installation procedures for engine 1 and engine 2 throttle control linkage being identical, only engine 1 removal/installation is described.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms
B. 99A76101003000	Pin-Rigging, Throttle Control Microswitch Unit
C. 98A27901005000	Pin-Rigging, Cable Tension Regulator
D. 98A76103000000	Pin-Rigging, Cable Tension Regulator
E.	Circuit Breaker Safety Clips
F.	Cotter Pins
G.	Safety Clips-Turnbuckle
H.	Ambiant Thermometer
I.	Warning Notices Prohibiting Maneuvers
Referenced Procedures	
- 20-29-00, P. Block 1	System Cabling
- 76-11-23, P. Block 401	Cable Tension Regulator
- 76-11-00, P. Block 501	Throttle Controls

CAUTION : BEFORE ATTEMPTING ANY MAINTENANCE OPERATION ON THROTTLE CONTROLS, OPEN, SAFETY AND TAG THE FOLLOWING CIRCUIT BREAKERS :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SYS1/28VDC	306CJ1	102/H 8
21VU	AFS/TCC/SYS1/115VAC	308CJ1	102/H 9
21VU	AFS/TCC/SENSOR	305CJ1	102/H10
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1 & 2/START/CTL & WARN	1KG	335/R68

2. Throttle Control Linkage

A. Job Set-Up

(1) In flight compartment, place one warning notice on panel 429VU and another on throttle control levers (9VU) which are in Forward Idle Throttle position.

(2) In avionics compartment, open access door 121BL.

(3) Install rigging pin 99A76101003000 in microswitch unit 113VU (112VU). If rigging pin cannot be inserted, adjust length of dynamometric rod until it is possible (Ref. 76-11-00, P. Block 501).

(4) On cable tension regulator install locking tool 98A76103000000. Adjust length of adjustable rod if necessary until tool installation is possible

(Ref. 76-11-00, P. Block 501).
Keep tool in its housing.

B. Removal (Ref. Fig. 401)
(1)Unsafety and remove nuts (1) and (9), remove washers (2) and (8), bolts (4) and (7) and disassemble rod (5) from levers (3) and (6).
(2)Unsafety and remove nuts (12) and (18), remove washers (11) and (17), bolts (10) and (23). Pivot lever (6) to disassemble rod (24).
(3)Unsafety and remove nuts (16) and (21), remove washers (15) and (20), bolts (13) and (19). Pivot lever (22) to disassemble rod (14).

C. Preparation of Replacement Component
(1)Make certain that components are clean and free from nicks or corrosion.

D. Installation (Ref. Fig. 401)
(1)Install the two ends of rod (14) and (24) in levers (6) and (22). Install bolts (13), (19), (23) and (10), washers (15), (20), (17) and (11), nuts (16), (21), (18) and (12). Tighten and safety with new cotter pins.
(2)Install rod (5) in lever (3) and (6). Install bolts (4) and (7), washers (2) and (8), nuts (1) and (9). Tighten and safety with new cotter pins.

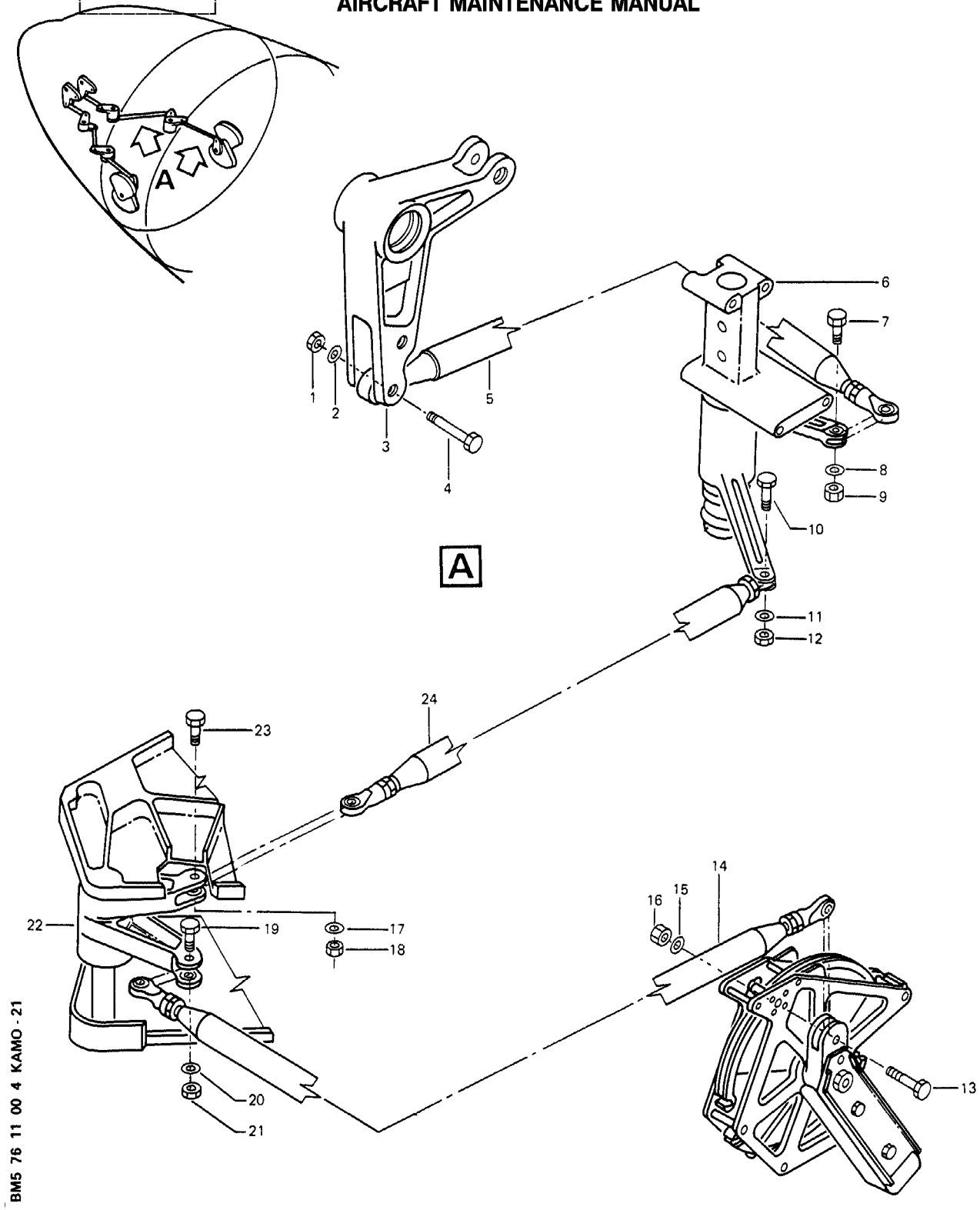
E. Adjustment/Test
Refer to 76-11-00, P. Block 501.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove warning notices.
(3)Close avionics compartment access door 121BL.
(4)Remove safety clips and tags and close circuit breakers 306CJ1, 308CJ1, 305CJ1, 1JH, 2JH, 8JH, 1KG, 1KM and 2KM.

3. Throttle Controls in Fuselage

A. Job Set-Up
(1)In flight compartment, place one warning notice on panel 429VU and another on throttle control levers which must be in Forward Idle Throttle position.
(2)Install access platform at FWD cargo compartment door and open door.
(3)Open avionics compartment access door 121BL.
(4)Remove cargo compartment ceiling panels giving access to cable routing concerned.
(5)Install rigging pin 98A27901005000 in cable tension regulator.
(6)Install rigging pin 99A76101003000 in autothrottle coupling unit pulley.

B. Removal (Ref. Fig. 403, 402)
(1)Remove and discard safety clips (1) from turnbuckles (2). Gradually loosen turnbuckle (2) barrels until installation of locking tool 98A76103000000 on cable tension regulator is possible.
(2)Remove and retain turnbuckle (2) barrel of cable to be removed. Stow on



Throttle Control Linkage
Figure 401

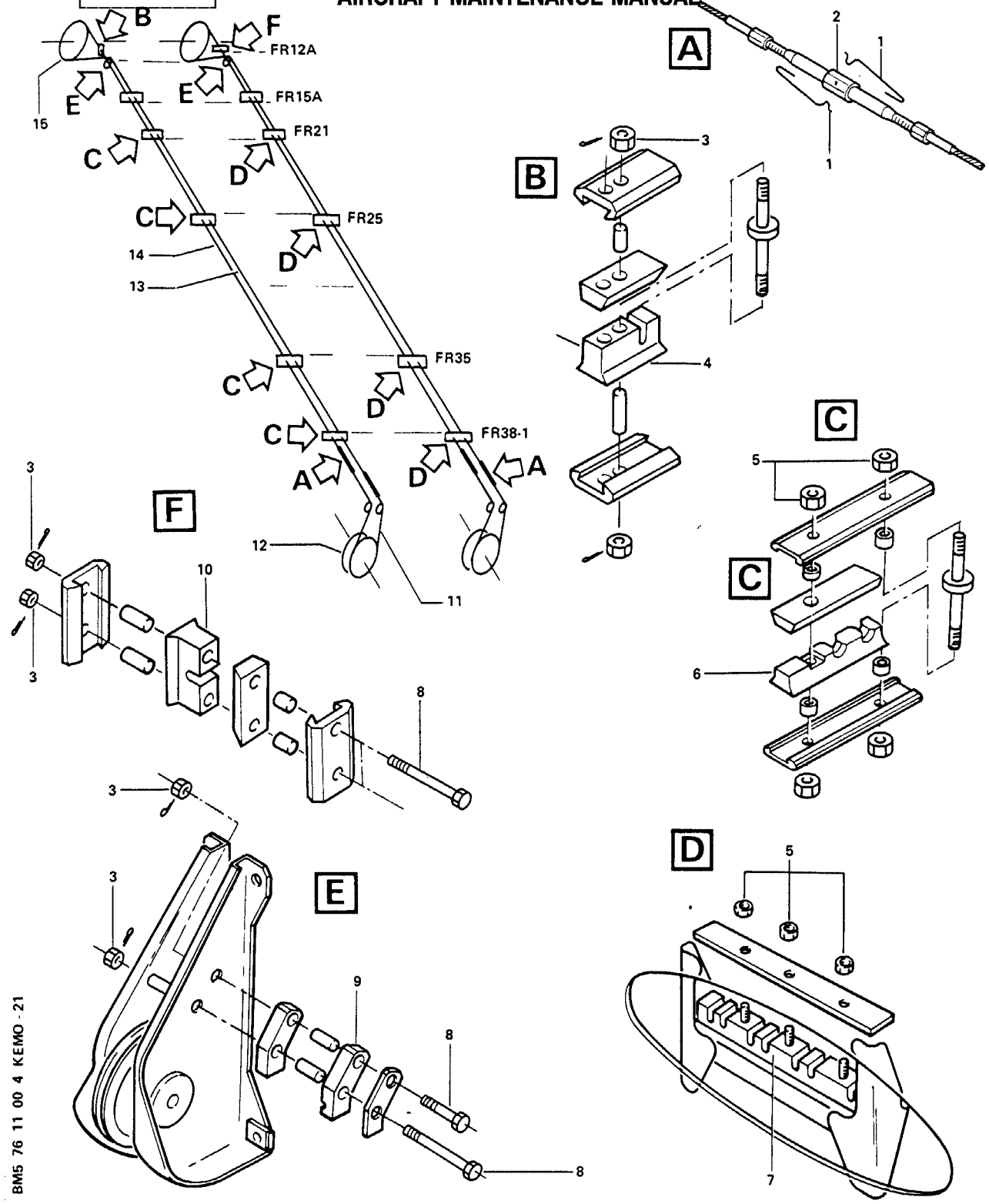
structure the sections of cable remaining on aircraft.
(3)Unsafety and remove nuts (3), bolts (8) and fairleads assembly (4), (9) and (10).
(4)Remove nuts (5) and fairleads assembly (6) and (7).
(5)Remove casing (18) and (19) from cable tension regulator (15) then fairleads (16) and (17) (Ref. 76-11-23, P. Block 401).
Free end of cable to be removed from its recess in regulator quadrant (15).
(6)Remove cable run (13) or (14) as required.
(7)Remove and retain fairleads from ATS coupling unit.
Disengage and remove cable run (11) or (12) as required.

C. Preparation of Replacement Component
(1)Check linkage components for correct condition and security of attachment. Check pulleys, cables and push-pull cables for traces of wear, corrosion or rubbing. Check cables (Ref. 20-29-00, P. Block 1).

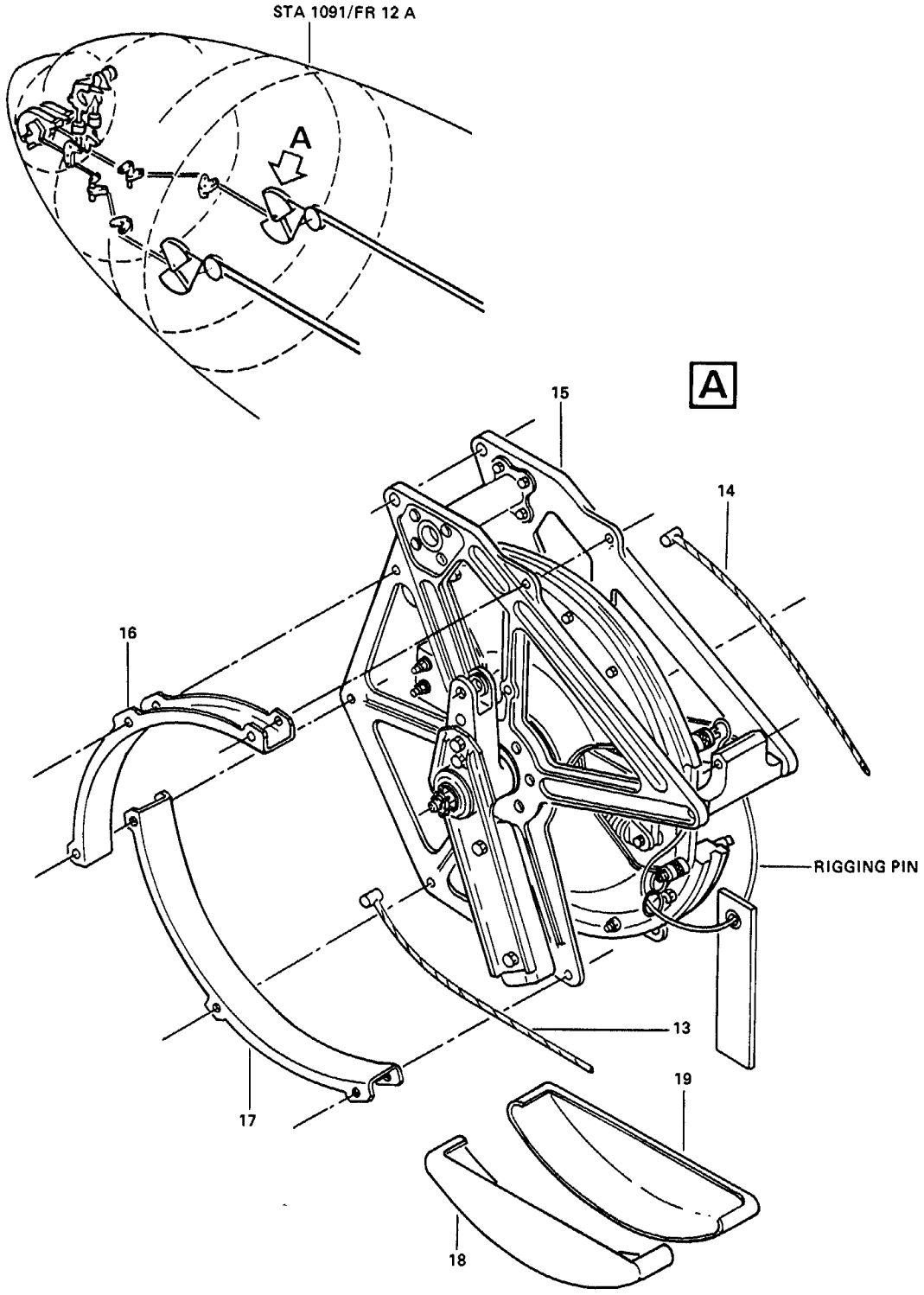
D. Installation (Ref. Fig. 403, 402)
(1)Install cable run (11) or (12) in its recess in ATS coupling unit.
Install fairleads on ATS coupling unit.
(2)Install end of cable (13) or (14) into its recess in regulator quadrant (15).
(3)Hold end of cable to be installed in its recess and install fairlead (16) then (17).
Install casings (18) and (19) (Ref. 76-11-23, P. Block 401).
(4)Engage cable (13) and (14) to be installed in fairleads (4), (9), (10), (6) and (7). Tighten bolts (8), nuts (3) and (5). Safety nuts (3) with new cotter pins and bolt (8) with lockwire.
(5)Engage at the same time threaded ends of the two cable runs to be assembled in turnbuckle (2) barrel. Slightly tighten turnbuckle (2).

E. Adjustment/Test
Refer to 76-11-00, P. Block 501.

F. Close-Up
(1)Safety turnbuckles (2) with new safety clips item I.
(2)Install cargo compartment ceiling panels.
(3)Remove rigging pins 98A27901005000 and 99A76101003000.
(4)Close avionics compartment access door.
(5)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(6)Remove access platform.
(7)Remove safety clips and tags and close circuit breakers 306CJ1, 308CJ1, 305CJ1, 1JH, 2JH, 8JH, 1KG, 1KM and 2KM.



Throttle Controls in Fuselage
Figure 402



Cable Tension Regulator
Figure 403

THROTTLE CONTROLS - ADJUSTMENT/TEST

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform 2.70 m (9 ft.)
	B.	Ambient Temperature Thermometer
	C.	Tensiometer
	D.	Circuit Breaker Safety Clips
	E.	Cotter Pins
	F.	Lock washer
	G.	Turnbuckle Safety Clips
	H.	Corrosion - Resistant Steel Lockwire Dia. 0.032 in. (0.813 mm)
R	J.	Dynamometer
R	K. 99A76101003000	Pin - Rigging - Throttle Control Microswitch Unit
R	L. 98A27901005000	Pin - Rigging, Cable Tension Regulator
R	M. 98A76101003000	Pin - Rigging, Autothrottle Coupling Unit
R	N. 98A76103000000	Bar - Locking, Throttle Control Cable Tension Regulator "0" Position
R	P. 86539A4254000	Quadrant - Graduated, Throttle and Thrust Reverser Controls
R	Q. 98A76103004000	Adapter - Spring Scale
	97A76102003000	Adapter - Spring Scale
	97A27902016000	Spring Scale Assy
R	R. 35M5M01140001	Test Set - Thrust Reverser Microswitches
R	S. P13736	Pin-Rigging - Transducer Unit
	Referenced Procedures	
	- 22-33-16, P. Block 401	Throttle Position Detectors
	- 27-12-31, P. Block 401	Aileron/Rudder Trim Control Panel
	- 31-57-11, P. Block 401	ECAM Control Panel (5WT)
	- 34-52-13, P. Block 401	ATC Control Unit (4SH)
	- 76-11-22, P. Block 401	Throttle Control Microswitch Unit

2. Procedure

CAUTION : **WHEN INSTALLING RIGGING PINS, CABLE TURNBUCKLES MUST BE DIFFERENTIALLY ADJUSTED TO PERMIT FREE INSTALLATION OF PINS DURING TEST PROCEDURES. IF ANY FORCE IS REQUIRED TO REMOVE OR INSTALL RIGGING PINS ; CABLE TURNBUCKLES, ROD ENDS, OR CLEVIS ENDS MUST BE ADJUSTED COMPLYING WITH THIS PROCEDURE TO ELIMINATE BINDING. DO NOT FORCE RIGGING PINS INTO HOLES TO OBTAIN ALIGNMENT.**

NOTE : The adjustment procedure is the same for RH and LH throttle controls. It consists in adjustment procedure between throttle control and autothrottle coupling.

NOTE : The procedure may be carried out with aircraft on jacks or on wheels
- Unless specified in the test, all the operations must be performed without energizing the aircraft.
- Microswitch units 112VU and 113VU and TLA resolvers are considered adjusted.

- Check for absence of gap in control linkage items (bellcranks, bearings, rods etc.).

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SENSORS	305CJ1	102/H10
21VU	AFS/TCC/SYS1/28VDC	306CJ1	102/H 8
21VU	AFS/TCC/SYS1/115VAC	308CJ1	102/H 9

CAUTION : DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF THROTTLE CONTROL LEVERS ON PANEL 9VU.

(2)Position access platforms at FWD cargo compartment.

(3)In avionics compartment, open access door 121BL.

(4)In forward cargo compartment at STA2210, remove panels 131SW, 131RW,
R 132SW, 131AZ, 132AZ, 131AC, 131BC, 131CC, 131DC, 131EC, 131FC, 131GC,
R 132AC, 132BC, 132CC, 132DC, 132EC, 132FC and 132GC.

(5)Fully untighten friction brake prior to adjustment.

B. Preliminary Checks

CAUTION : IF THE FOLLOWING PROCEDURE IS ACCOMPLISHED AFTER REMOVAL/ INSTALLATION OF THE THROTTLE CONTROL CABLES, IN THE FUSELAGE, MAKE CERTAIN THAT THESE CABLES ARE CORRECTLY INSTALLED. MAKE CERTAIN THAT THERE ARE NO DOUBLE INVERSIONS.

(1)Linkage components for correct conditions and security of attachments.

(2)Possible interferences.

(3)Pulleys, cables, for traces of wear, corrosion, or rubbing.

C. Adjustment Between Throttle Control Levers and Autothrottle Coupling Unit

(Ref. Fig. 501)

(1)Adjustment between microswitch unit and cable tension regulator.

(a)Place throttle control lever in Forward Idle position.

(b)Rig microswitch unit with rigging pin 99A76101003000.

(c)Make certain that in this position drift pin P13736 can be easily inserted in and removed from throttle detectors.

(d)If drift pin can not be inserted (Ref. 22-33-16, P. Block 401).

(e)Remove drift pin in throttle detectors.

(2)Adjustment between microswitch unit and cable tension regulator

(a)With microswitch unit pin rigged, make certain that in this position, rigging pin 98A27901005000 can be easily inserted and removed in cable tension regulator. If not, adjust length of rod (2).

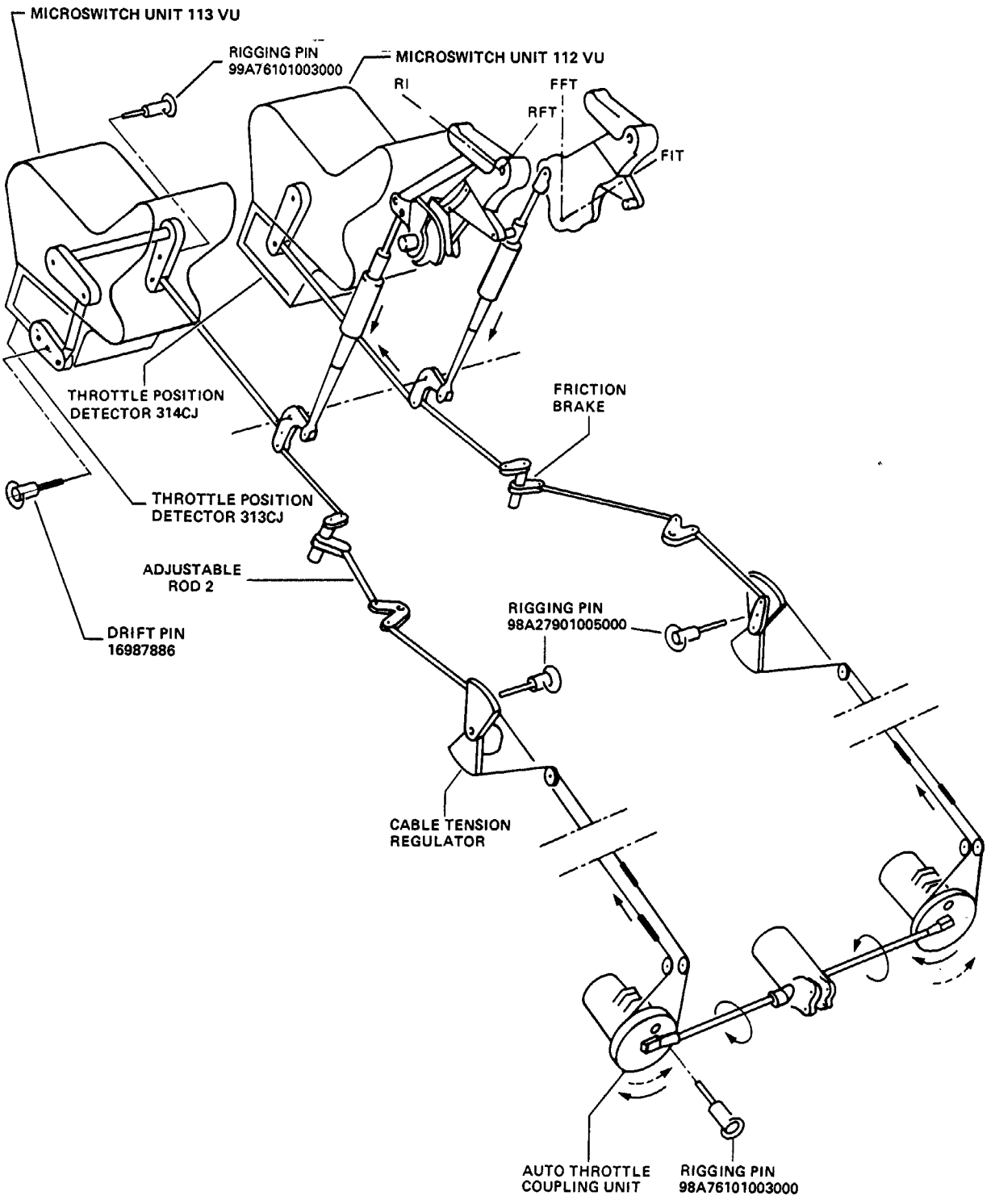
(b)Remove rigging pin on microswitch unit.

(3)Adjustment between cable tension regulator and autothrottle coupling unit (Ref. Fig. 502).

(a)With cable tension regulator pin rigged.

(b)Rig autothrottle coupling unit with rigging pin 98A76101003000.

(c)If rigging pin can not be installed on autothrottle coupling unit, slacken or tension one cable evenly using turnbuckle located between



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Adjustment Points
Figure 501

frames 38/1 and 40 in fuselage, so as to allow tension regulator locking pin 98A76101003000 to be slip fit installed.

(d)Note hall ambient temperature.

(e)Adjust cable tension until cable tension regulator index faces the scale graduation corresponding to ambient temperature.
The correspondance between ambient temperature and graduation is indicated in referenced graph (Ref. Fig. 502).

NOTE : During and after cable tensioning, flex the same length of cable on both runs and release immediately. During cable deflection, make certain that cable tension regulator locking crossbeam slides freely.

NOTE : Make certain that the two cable tension regulators are rigged at the same value.

(f)Make certain that rigging pins from cable tension regulator and autothrottle coupling unit slide freely in corresponding pin holes and remove pins.

(g)Proceed manually with several cycles of throttle control lever (to stabilize the control), then return to FIT.

(h)Rig cable tension regulator again and make certain that autothrottle coupling unit can be easily rerigged. If necessary readjust cable tension until easy rigging is obtained.

R (j)Safety cable tension regulators and turnbuckles.

R (k)Remove rigging pin from cable tension regulator.

D. Check of Thrust Reverser Control Lever

NOTE : Microswitches to be checked are 7KM and 13KM for LH and 8KM and 14KM for RH engines. For complete test of microswitches units (Ref. 76-11-22, P. Block 401).

R (1)Install graduated quadrant 86539A4254000 on control levers.

(2)Disconnect connectors 577VC from 113VU and 578VC from 112VU. Connect Test Set 35M5M01140001 to both microswitch units as identified on cable (Ref. Fig. 503)

(3)On test set :

(a)Place ON/OFF switch in ON position.

(b)Push LIGHT TEST pushbutton switch.

(c)Make certain that the eight lights come on.

(4)Place throttle control levers in FIT position.

(5)On test set, make certain that lights indicate OPEN position (lights on) for microswitches 13KM and 14KM and do not indicate CLOSED position (lights off) for 7KM and 8KM.

(6)Move slowly both thrust reverser control levers forwards RI position.

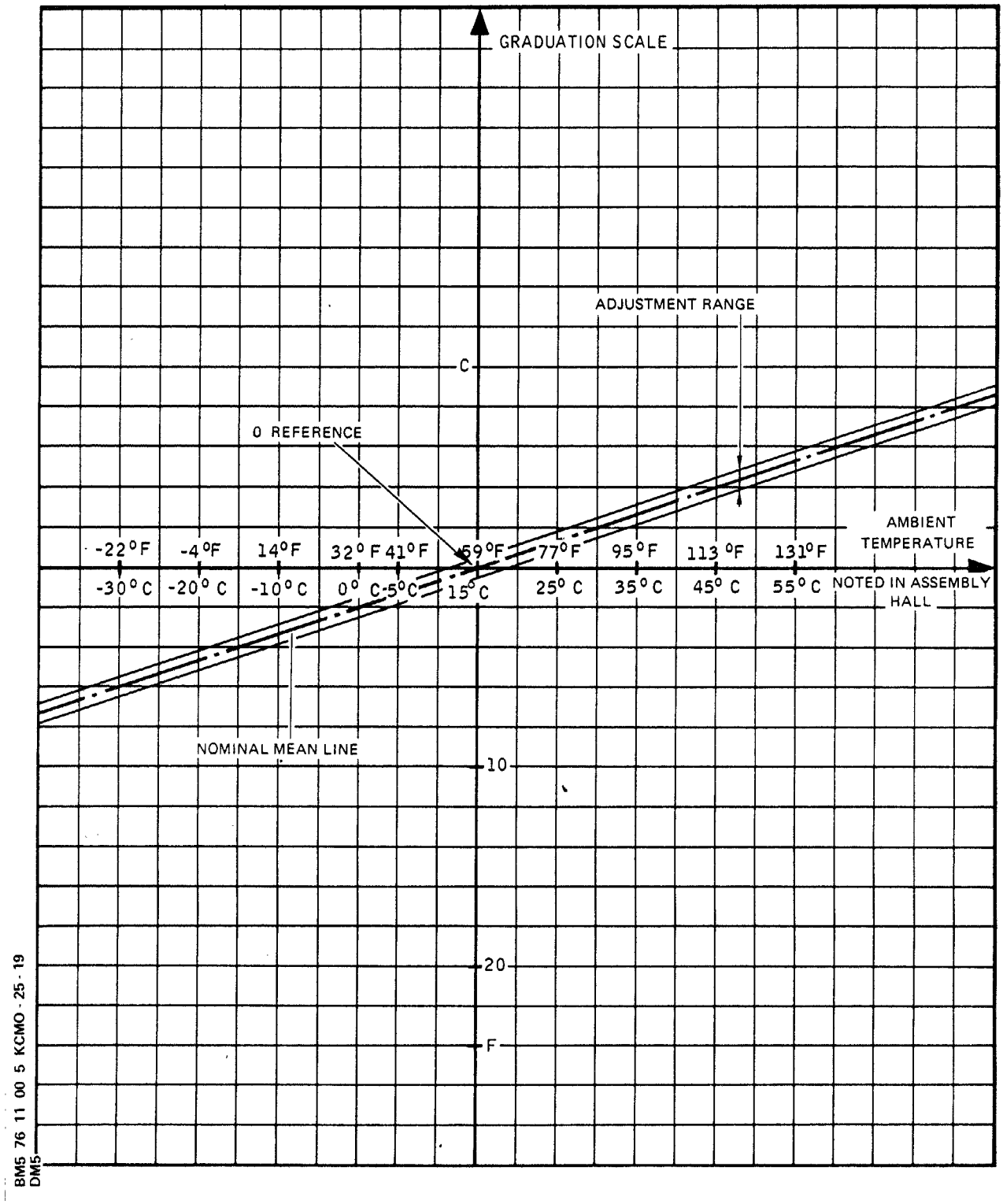
(7)Check the four microswitches close before the thrust reverser control levers reach 41° on quadrant and RI position.

(8)Move both thrust reverser control levers from RI to RFT and from RFT to RI.

(9)Check the four microswitches remain closed.

(10)Move slowly both thrust reverser control levers from RI to FIT position.

(11)On test set, make certain that lights indicate OPEN position (lights on) for microswitches 13KM and 14KM and do not indicate CLOSED position (lights off) for 7KM and 8KM when both thrust reverser control levers are



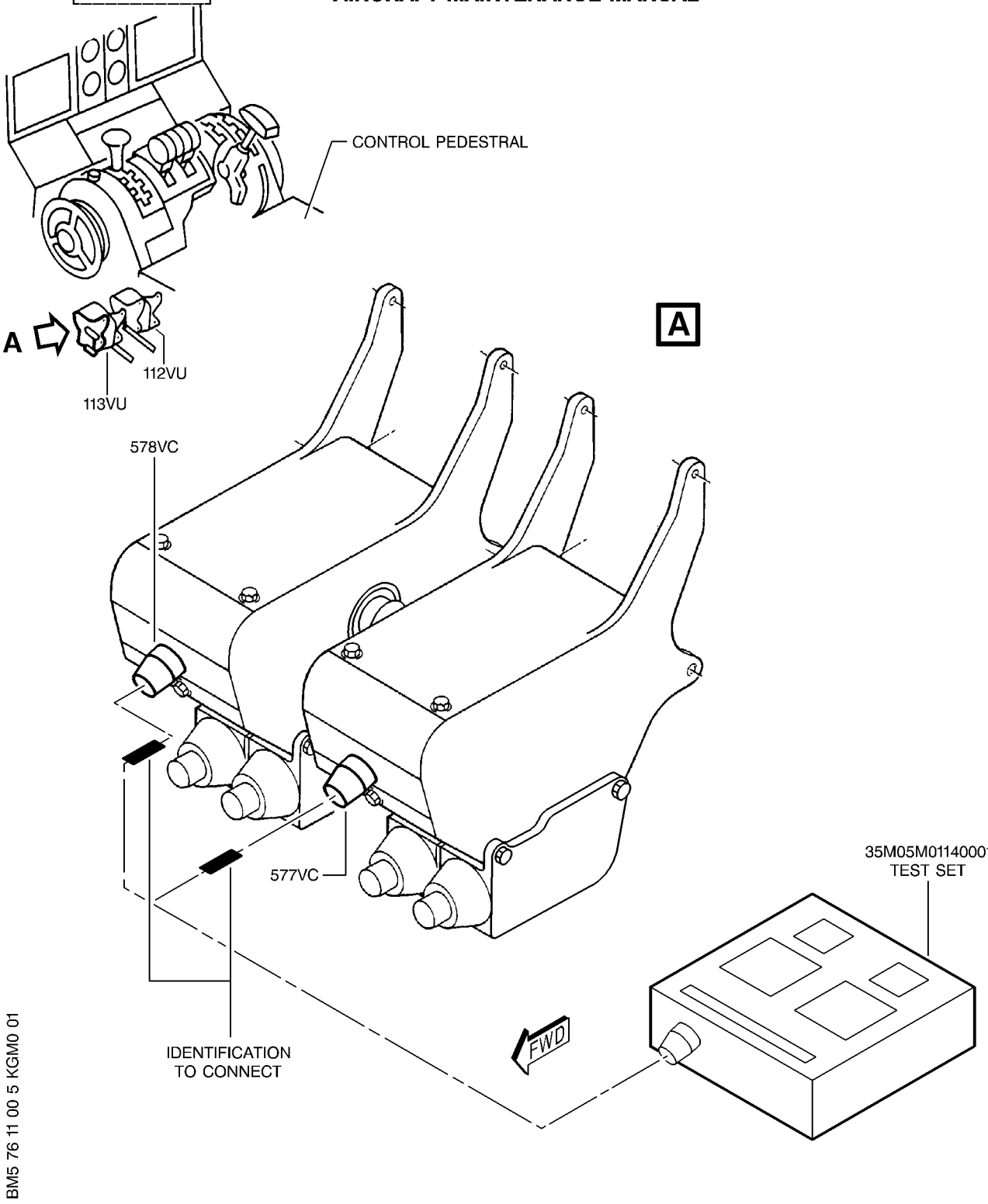
Fuselage Section - Cable Tension Adjustment Graph
Figure 502

between 28° 30' and 20° 30' on quadrant.
(12)Place ON/OFF switch in OFF position.
(13)Remove tool 35M5M01140001 and connect 577VC and 578VC.
R (14)Remove tool 86539A4254000.
(15)Check that levers are in FIT position.

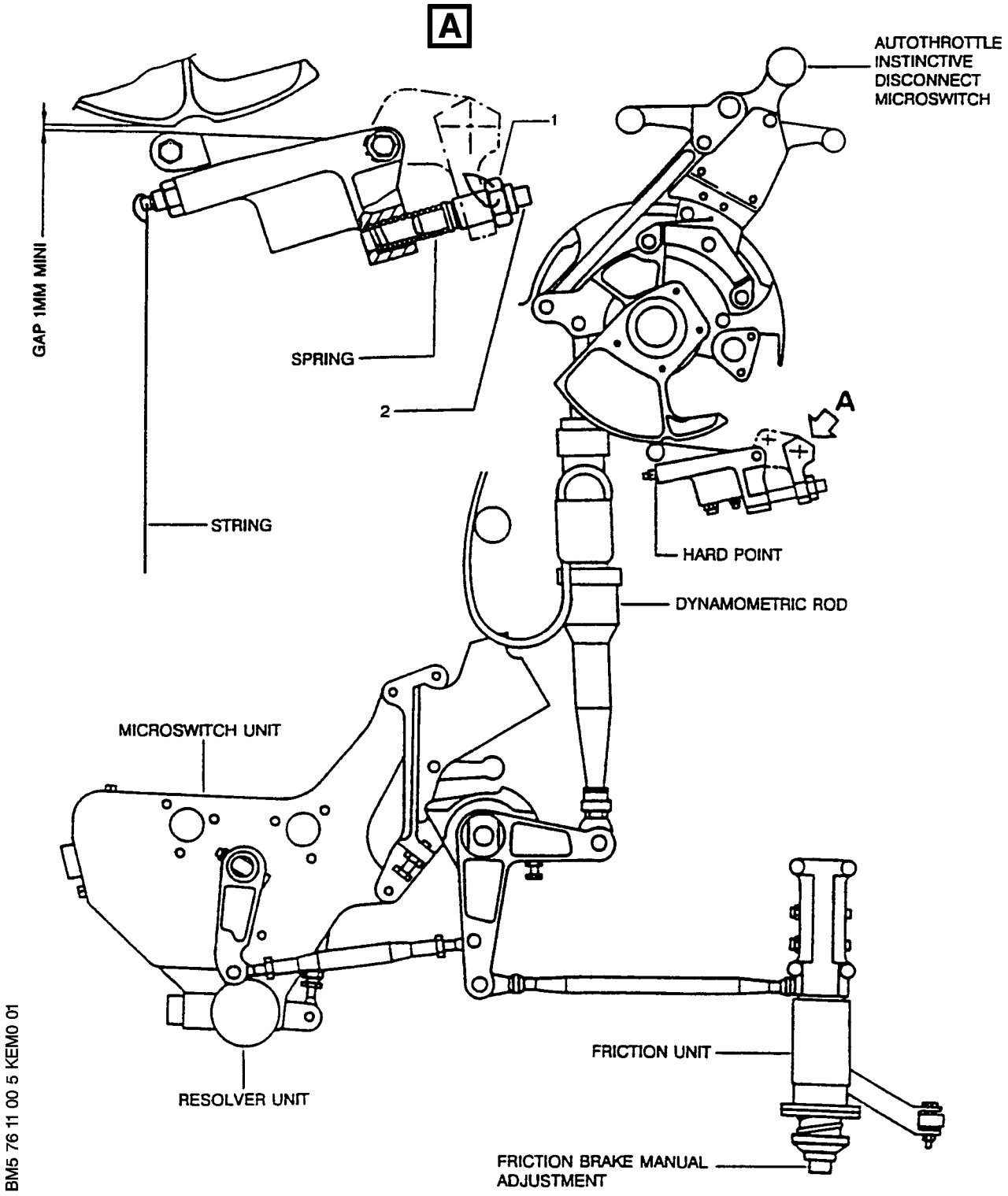
E. Check of Throttle Control Lever Effort
(Ref. Fig. 504)

NOTE : Effort should be applied very slowly in the same plane as and tangentially to the throttle knob displacement.
(1)On throttle control lever, install adapter and spring scale 97A76102003000 and 97A27902016000.
CAUTION : THROTTLE CONTROL LEVER MUST BE MOVED VERY SLOWLY TO GET A CORRECT MEASUREMENT.
(2)Note the displacement effort from 45° to FFT.
(3)Check the effort is between 2.6 and 3.4 lbf. (1.17 and 1.54 daN) and check the difference noted between the efforts on both levers is less than 0.25 lbf. (0.11 daN).
(4)If effort is below 2.6 lbf. (1.17 daN), in the avionics compartment below the center pedestal, manually rotate the friction brake clockwise to increase effort.
(5)If effort is above 3.4 lbf. (1.54 daN), perform the corrective actions applicable in case of hard throttle control movement (Ref. TSM 76-00-40).
NOTE : If adapter 97A76102003000 is not used, check the effort is between 2.9 and 3.7 lbf. (1.31 and 1.67 daN), and check the difference noted between the efforts on both levers is less than 0.25 lbf. (0.11 daN).

F. Check of Thrust Reverser Control Lever Effort
NOTE : Effort should be applied very slowly in the same plane as and tangentially to the thrust reverser control lever knob displacement.
(1)Pull thrust reverser control levers to the RIT position.
(2)On thrust reverser control lever, install adapter and spring scale 98A76103004000 and 97A27902016000.
(3)Note friction point effort when moving lever from RIT to FIT.
(4)Check that this peak effort is between 4 and 6 lbf. (1.8 and 2.8 daN), and the difference noted between the efforts on both levers is less than 0.55 lbf. (0.25 daN).
(5)If the force is no correct, adjust the spring as follows :
(a)Get the access to the adjustement screw.
1 Remove the Aileron/Rudder Trim Control Panel (408VU) (Ref. 27-12-31, P. Block 401).
2 Remove the ECAM Control Panel (5WT) (Ref. 31-57-11, P. Block 401).
3 Remove the ATC Control Unit (4SH) (Ref. 34-52-13, P. Block 401).
(b)Remove the lockwire and loosen the nut (1).
(c)Unscrew the adjusting screw (2) to obtain a peak force of 5 ± 1 lbf. (2.3 ± 0.5 daN) required to move the thrust reverser control lever from RIT to FIT.
(d)Check the gap between the roller and the cam as the spring is fully



R Test of Microswitches
Figure 503



Adjustable Friction Brake and Hard Point Location
Figure 504

compressed (Ref. Fig. 504).
1 Attach a string (= 1m) on the screw.
2 Pull down the string to fully compress the spring and retract the roller.
3 With a shim, check that the gap between the roller and the top of the cam in FIT position is 0.04 in. (1 mm).
4 Remove the string.

(e) Hold the screw (2) and tighten the nut (1) not to turn the screw and modify adjustment of spring.
(f) Wirelock the nut.
(g) Install the Aileron/Rudder Trim Control Panel (408VU) (Ref. 27-12-31, P. Block 401).
(h) Install the ECAM Control Panel (5WT) (Ref. 31-57-11, P. Block 401).
R (j) Install the ATC Control Unit (4SH) (Ref. 34-52-13, P. Block 401).
R NOTE : If adapter 98A76103004000 is not used :
- Check that the peak effort is between 7.5 and 8.8 lbf. (3.4 and 4 daN).
- If the effort is not correct adjust the spring to obtain a peak force of 8.15 ± 0.65 lbf. (3.7 ± 0.3 daN).

(6) Remove adapter and spring scale from reverser control lever.
A minimum gap of 1mm between the roller and the cam must be obtained as per Detail A (Ref. Fig. 504).
(5) Remove adapter and spring scale from reverser control lever.

3. Close-Up

A. Check that all rigging pins have been removed.

B. Remove all tools.

C. Close access doors.

D. Remove access platform.

E. Remove warning notices.

F. Make certain that throttle control levers are in idle position.

G. Remove safety clips and tags and close circuit breakers 305CJ1, 306CJ1, 308CJ1.

THROTTLE CONTROL LEVER - REMOVAL/INSTALLATION

1. Removal/Installation of the Roller

A. Equipment and Materials

	ITEM	DESIGNATION
R	(1)	Warning Notice
R	(2)	Cotter Pin
R	(3)	Blanking Caps
R	(4)	Corrosion-Resistant Steel Lockwire

Referenced Procedures

- 22-10-00, P. Block 501	Autopilot
- 22-30-00, P. Block 501	Autothrottle Control
- 25-11-12, P. Block 401	First Officer Seat
- 27-41-11, P. Block 401	Pitch Trim Control Mecanism
- 29-10-00, P. Block 301	Main Hydraulic Power
- 74-00-00, P. Block 501	Ignition-General
- 76-11-00, P. Block 201	Throttle Controls
- 76-11-00, P. Block 501	Throttle Controls

WARNING : BEFORE ATTEMPTING ANY MAINTENANCE PROCEDURES ON THE CENTER CONTROL PEDESTAL, MAKE CERTAIN THAT WARNING NOTICES AND SAFETY BARRIERS ARE IN PLACES.

B. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SYS1/28VDC	306CJ1	102/H 8
21VU	AFS/TCC/SYS1/115VAC	308CJ1	102/H 9
21VU	AFS/TCC/SENSORS	305CJ1	102/H10
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1 & 2/START/CTL & WARN	1KG	335/R68

(2)Check that throttle control lever and thrust reverser control lever are in FIT position.
(3)On panel 429VU and 9VU.
- Display a warning notices prohibiting operation of throttle control levers, pitch trim control wheel, and flap and slat control lever.

(4)Remove First Officer's seat (Ref. 25-11-12, P. Block 401).
(5)In avionics compartment, open access door 121BL.
(6)Depressurize the following hydraulic systems (Ref. 29-10-00, P. Block 301).

(7)Get the access to the roller (Ref. Fig. 401).
NOTE : Before removal, make certain that ENG1 and ENG2 HP fuel shut-off valve control levers are in OFF position.
(a)Remove right pitch trim control wheel (Ref. 27-41-11, P. Block 401).
(b)Remove screws (1) and side cover (2).
(c)Remove screws (19) and upper side panel (5).
(d)Remove side plate (3) fitted with electrical connectors.
1 Disconnect and cap connectors.
2 Cut and remove lockwire, remove and retain the four screws together with washers.
3 At the two locations cut and remove lockwire, remove and retain nut (14) together with washer (15).
4 Remove screw (18) together with washer (17), remove the two clamps (16). Retain these parts for installation.
(e)Remove screws (20) and remove lower side panel (4).
(f)At upper part of center pedestal, remove position indexes (12) and (13) from throttle control levers (7).
1 Remove and retain screws (9) and (10).
2 Remove position indexes (12) and (13).
(g)Remove the three screws attaching the inside cover (6) to lever. Remove the cover.
(h)Remove screws and graduated gate (11).
R (j)Remove screws and casing (8) protecting throttle control levers (7).

**ON A/C 101-200,

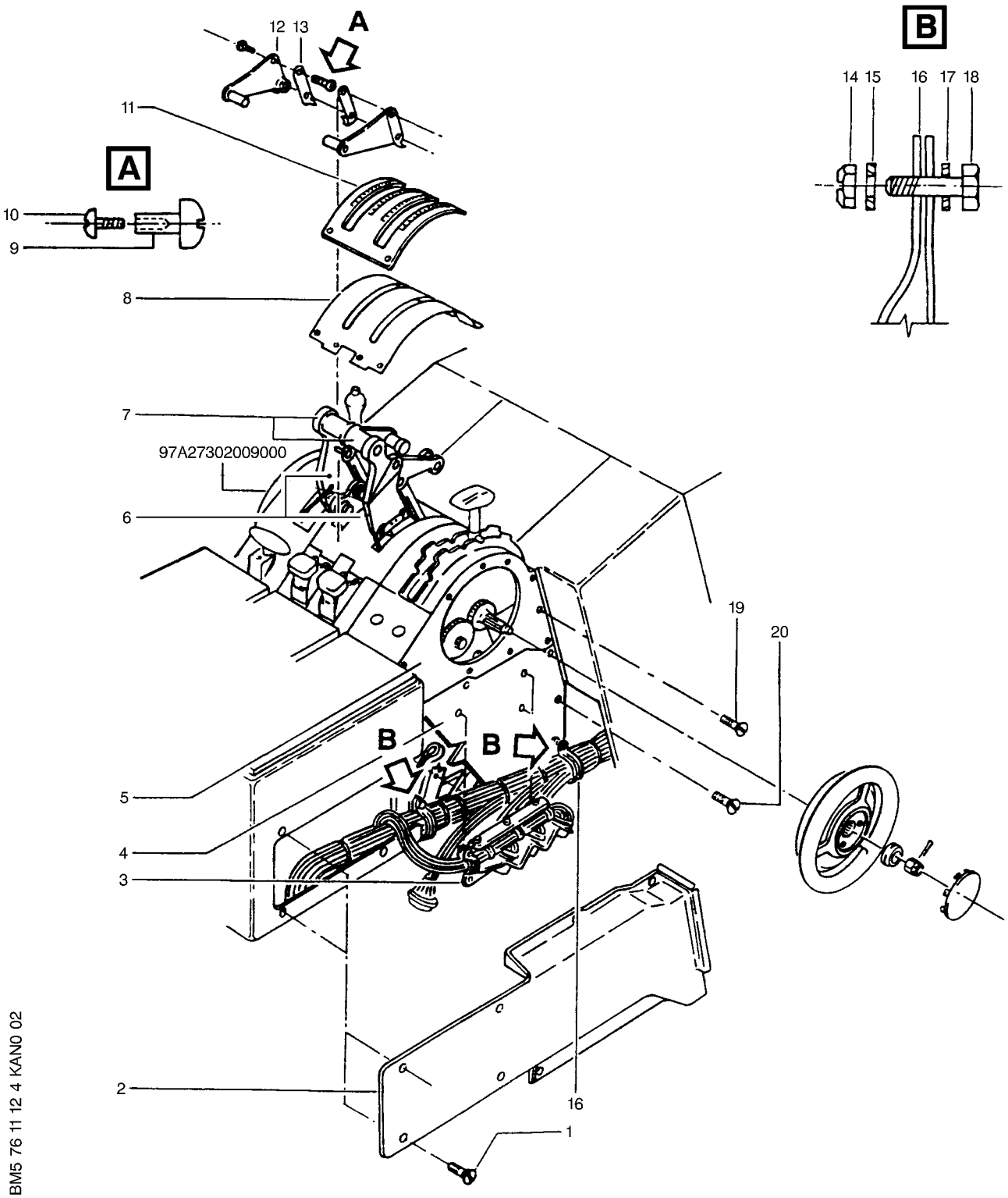
C. Removal of the Roller Assembly (Ref. Fig. 402)
(1)Remove and discard the cotter pin (3).
(2)Remove and retain the nut (2), washer (1).
(3)Remove the bolt (5).
(4)Keep the two bushes (6) and (8) installed and remove the bearing (7).

D. Installation of the Roller Assembly (Ref. Fig. 402)
(1)Position the bearing (7) into the bracket (4).
(2)Install the bolt (5).
(3)Install the washer (1) and the nut (2).
(4)Tighten the nut and safety with a new cotter pin (3).

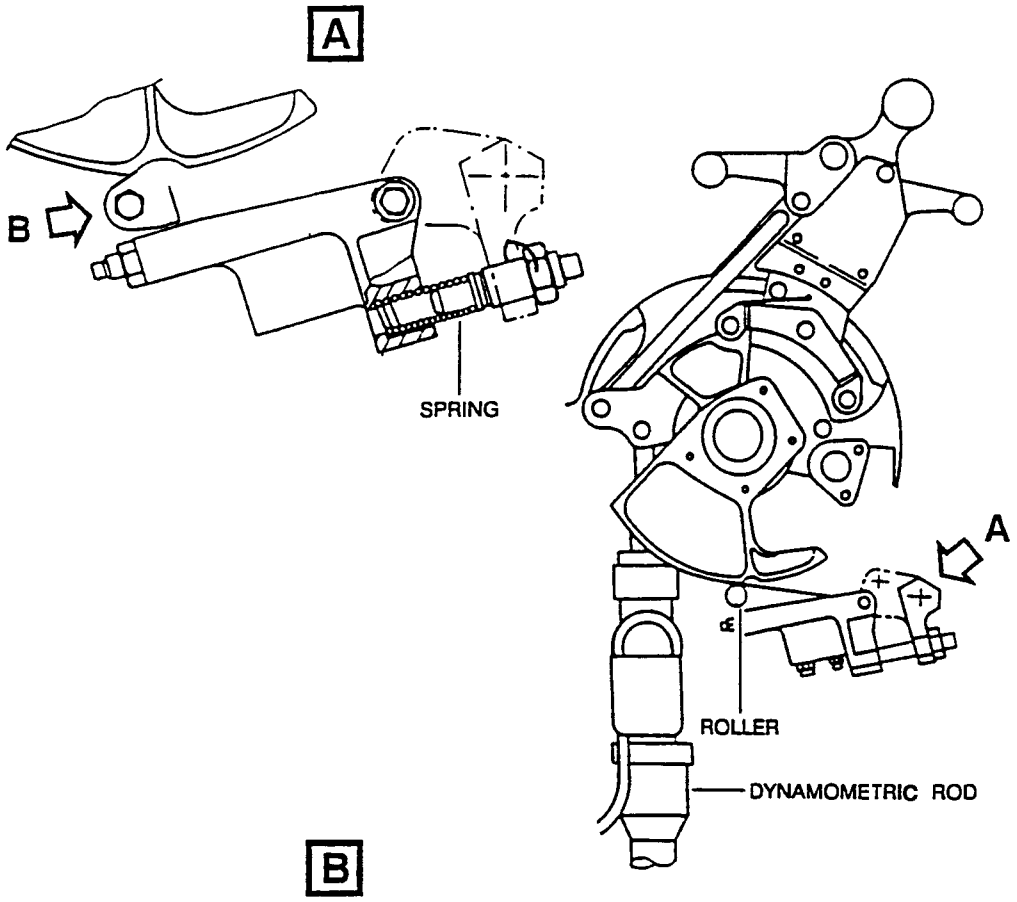
**ON A/C 101-200,

E. Test
(1)Check of thrust reverser control lever effort and Throttle Control lever effort (Ref. 76-11-00, P. Block 501).

F. Close-Up
(1)Install right lower side panel (4) and secure with screws.



Access to Roller
Figure 401



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Roller Installation
Figure 402

(2)Install side plate (3) supporting electrical connectors. Secure with the four screws and safety with 0.5 mm (0.02 in.) dia. lockwire. Remove blanking caps and connect electrical connectors to side plate (3).
(3)Install the two clamps (15).
(a)Install screw (17) together with washer (16).
(b)Install washer (14).
(c)Install nut (13), tighten and safety with 0.5 mm (0.02 in.) dia. lockwire.
(4)Install upper side panel (5) and secure with screws (18).
(5)Install side cover (2) and secure with screws (1).
(6)Install right pitch trim control wheel (Ref. 27-41-11, P. Block 401).
(7)Install casing (7) protecting throttle control levers (6) and secure with screws.
(8)Install graduated sector and secure with screws.
(9)Install position indexes (11) and (12) on throttle control levers (6).
(a)Install position index (11) and secure with screw (8).
(b)Install position index (12) diametrally opposed and secure with screw (9).
(10)Install the inside cover (20) with the three screws. Tighten the screw.
(11)Make certain that throttle control levers move freely, without friction between fixed and moveable parts in the working area.
(12)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

R
R (13)Carry out the functional test of pitch trim control mechanism (Ref. 27-41-11, P. Block 401).
R (14)Carry out the operational test of auto throttle control (Ref. 22-30-00, P. Block 501).
R (15)Carry out the TO/GA lever test (Ref. 22-10-00, P. Block 501).
R (16)Carry out the test of start A and start B ignition system (Ref. 74-00-00, P. Block 501).
R (17)Install First Officer's seat (Ref. 25-11-12, P. Block 401) and carry out operational test (Ref. 25-11-12, P. Block 501).
R (18)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (19)In avionics compartment, close access door 121BL.
R (20)Remove warning notices.
R (21)Make certain that throttle control levers are in idle position.
R (22)Remove safety clips and tags, and close circuit breakers 308CJ1, 306CJ1, 305CJ1, 1JH, 2JH, 8JH, 1KG, 1KM, and 2KM.

2. Removal/Installation of the Bearing

A. Equipment and Materials

	ITEM	DESIGNATION
R	(1)98A27603006000	Rigging Pin
R	(2)98A27603005000	Rack Wrench
R	(3)	Torque Wrench-2 m.daN
R	(4)	Circuit Breaker Safety Clips
R	(5)	Corrosion Resistant Steel Lockwire dia.

ITEM		DESIGNATION
		0.02 in. (0.5 mm)
R	(6)	Cotter Pins
	Referenced Procedures	
	- 25-11-11, P. Block 401	Captains Seat
	- 25-11-12, P. Block 401	First Officer's Seat
	- 27-41-11, P. Block 401	Pitch Trim Control Mecanism
	- 76-11-00, P. Block 501	Throttle Controls

B. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SYS1/28VDC	306CJ1	102/H 8
21VU	AFS/TCC/SYS1/115VAC	308CJ1	102/H 9
21VU	AFS/TCC/SENSORS	305CJ1	102/H10
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1 & 2/START/CTL & WARM	1KG	335/R68

(2)Remove Captain's seat (Ref. 25-11-11, P. Block 401).

(3) Remove First Officer's seat (Ref. 25-11-12, P. Block 401).

C. Removal of the Throttle Control Levers

(1)Removal of the identification plates (Ref. Fig. 403).

(a)Remove screws (1) and plate (2).

(b) Remove screws (3) and plate (4).

(2)Removal of the graduated gate (Ref. Fig. 404).

(a)Remove and retain screws (5) and (6).

(b)Remove position indexes (1) and (2).

(c)Remove screws (3) and (4) and graduated gate (7).

(3)Removal of the inside covers (6) from the throttle control levers. (Ref. Fig. 401)

(a)Remove the three screws attaching each inside cover (6) to lever.

(b)Remove the covers.

(4)Removal of the upper covers (Ref. Fig. 405).

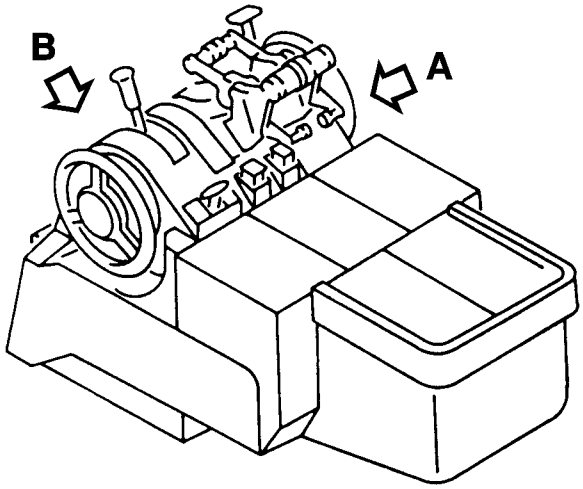
(a)Remove screws (1), (2), (4) and (5). Remove speedbrake control cover (3).

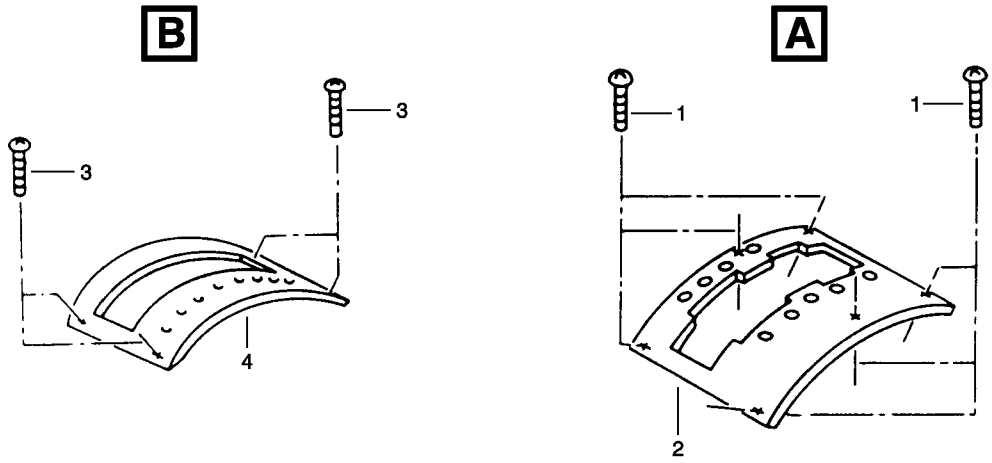
(b)Remove screws (6), (7), (9) and (10). Remove throttle control cover (8).

(c)Remove the screws (16) from the two brackets (17) supporting the throttle control cover and remove the bracket.

(d)Remove the screws (8) securing the handle to the Flap control lever. Remove the pin (9) (Ref. Fig. 404).

(e)Remove the screws (11), (13), (14) and (15). Remove Flap control handle cover (12) (Ref. Fig. 405).





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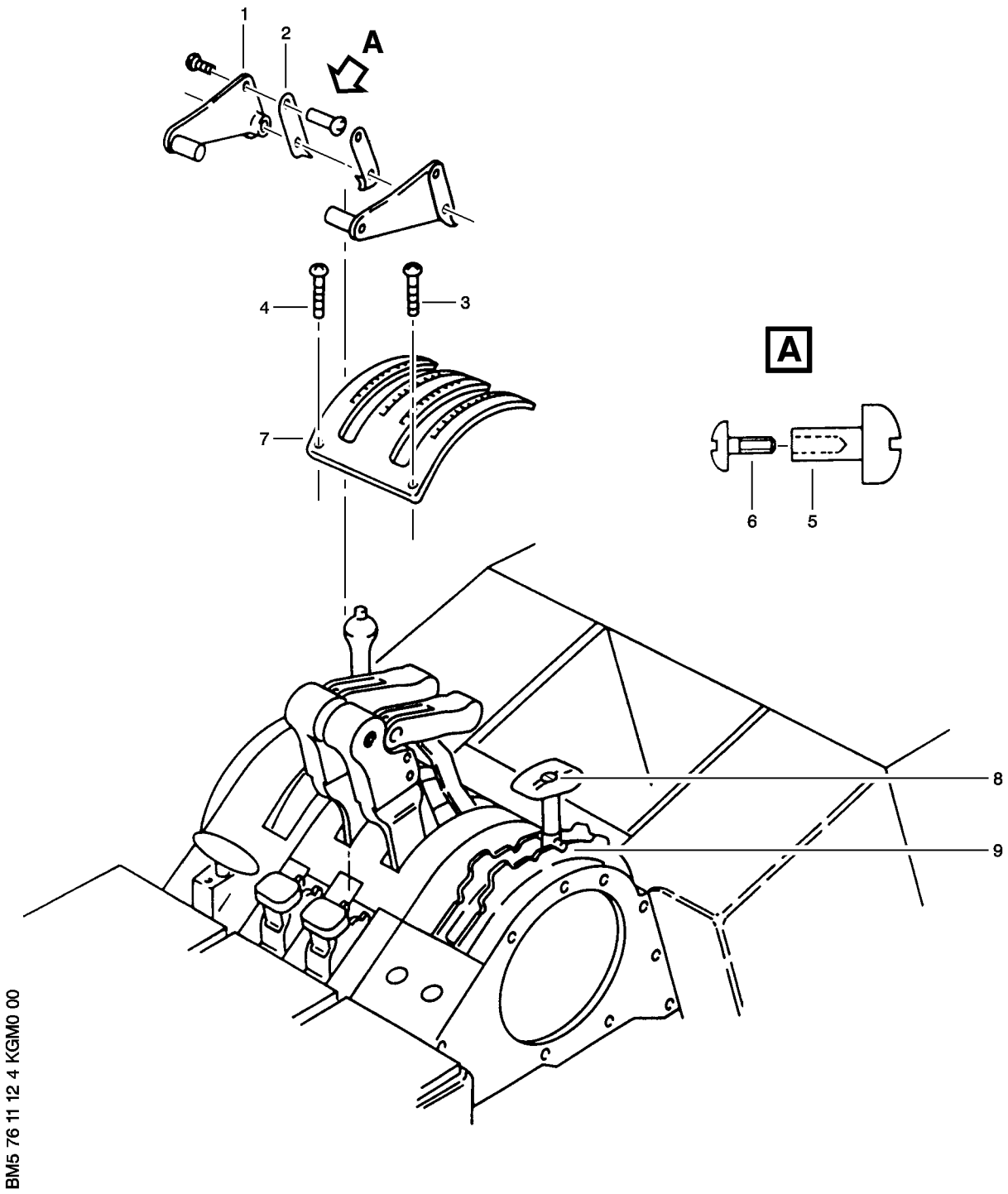
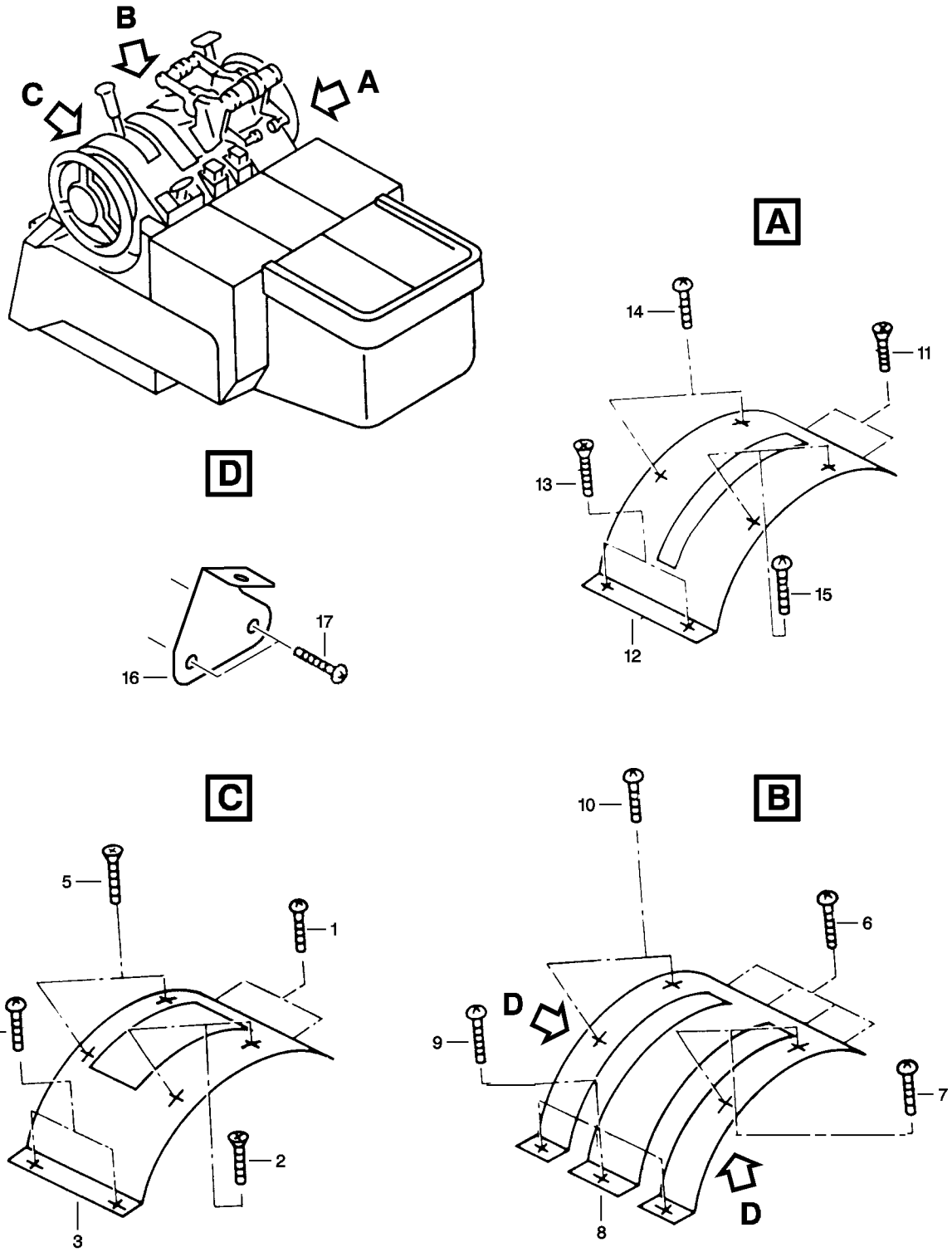
Identification Plates
Figure 403



Graduated Gate
Figure 404

(5)Remove the screws (1) and remove the side cover (2) (Ref. Fig. 401)
(6)Remove side plate (3) fitted with electrical connectors.
(a)Disconnect and cap connectors.
(b)Cut and remove lockwire, remove and retain the four screws together with washers.
(c)At the three locations, cut and remove lockwire, remove and retain nut (14) together with washer (15).
(d)Remove screw (18) together with washer (17), remove the three clamps (16). Retain these parts for installation.
(7)Remove screws (20) and remove lower side panel (4).
(8)Repeat step (5) thru (7) on the left side of center pedestal.
(9)Remove the LH and RH THS trim control wheels and the drive gears (Ref. 27-41-11, P. Block 401).
(10)On the LH and RH, remove screw (19) and upper side panels (5) (Ref. Fig. 401).
(11)Disconnect the dynamomatric rod (Ref. Fig. 406).
(a)At upper end of dynamometric rod (6) remove and discard cotter pin (1).
(b)Remove and retain nut (2), washer (3) and bush (4).
(c)Remove bolt (5) from rod/throttle lever connection. Retain bolt (5).
(d)Repeat steps (a) thru (d) for other rod.
(12)Remove the six clamps (8) from frame (Ref. Fig. 407).
(13)Remove the bolts (1) attaching the spacer (2) to the frame.
(14)Pivot forward the 2 clamps (5) located on the center spacer (2) and holding the dynamometric rod electrical cables.
(15)Pivot forward the center spacer (2) to remove the 2 lower clamps (4) holding the throttle control lever electrical cables (6).
(16)Remove the two clamps (4).
(17)Mark position of electrical cables (6) with respect to fixed clamps (3).
(18)Pull the electrical cables (6) inside the clamps (3) remaining fixed so as to leave some slack and permit disengagement of the throttle control lever.
(19)Push inner shaft (6) from right to left to remove it (Ref. Fig. 408) (Sheet 1/2).
NOTE : LH bearing (7) and washers (5) are removed with inner shaft (6). RH bearing (3) remains in outer shaft (8). Hold washer (4) during removal and retain it.
(20)Removal of outer shaft (8) (Ref. Fig. 408) (Sheet 2/2).
NOTE : Move outer shaft only sufficient to clear throttle lever assy but still retain speedbrake control.
(a)Remove lockwire from slotted nut (1).
(b)Using wrench 98A27603005000 remove slotted nut (1) and washer (2).
(c)Using rigging pin 98A27603006000 inserted in RH side of pedestal, push outer shaft to the left.
(21)Remove screws (8) and adapters (9) from throttle control levers (7) (Ref. Fig. 406).
(22)Move rigging pin 98A27603006000 to the right sufficient to clear throttle lever assembly but still retain flap/slat control.

D. Replacement of Throttle Control Bearing (Ref. Fig. 409)
(1)Removal of throttle control bearings.



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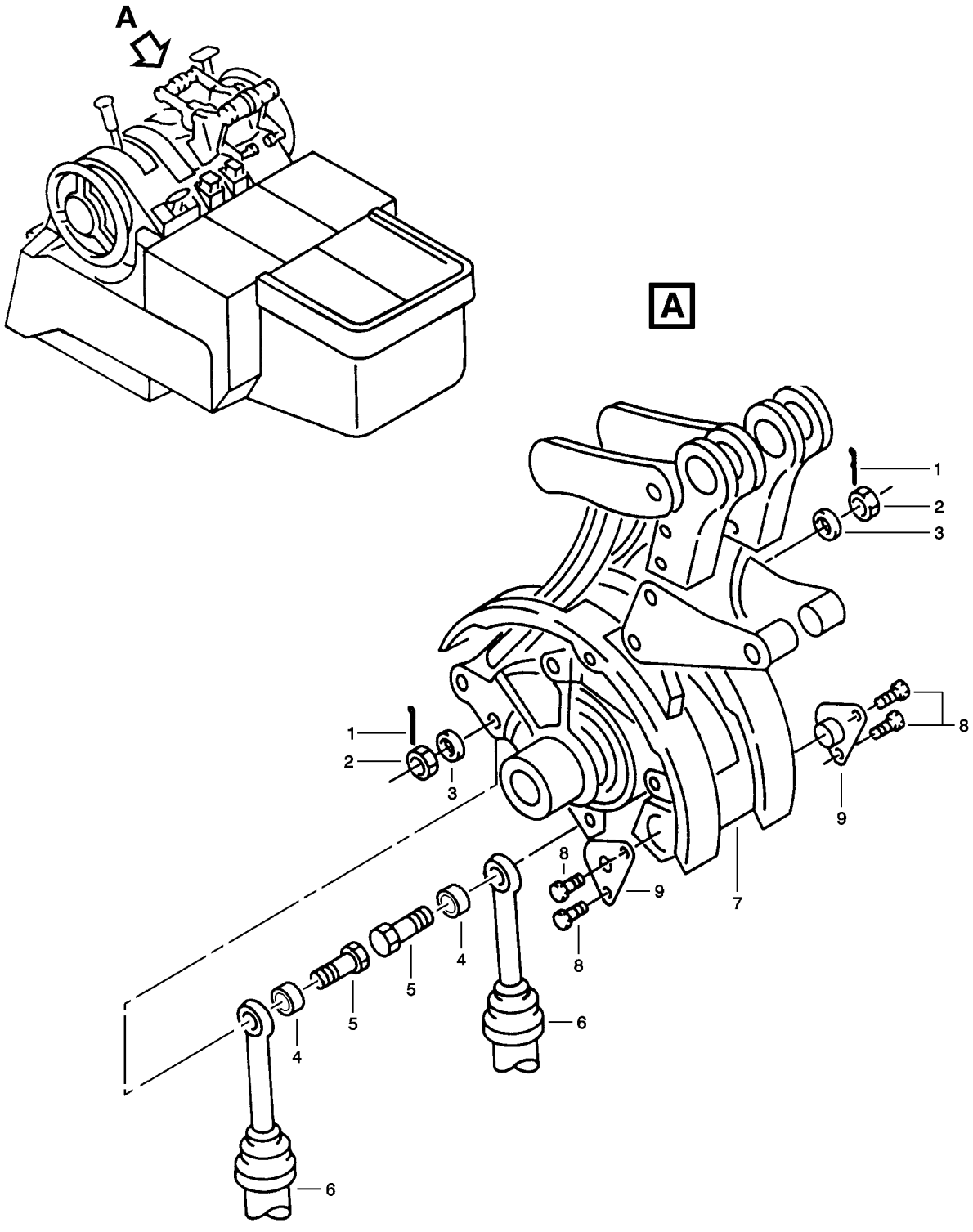
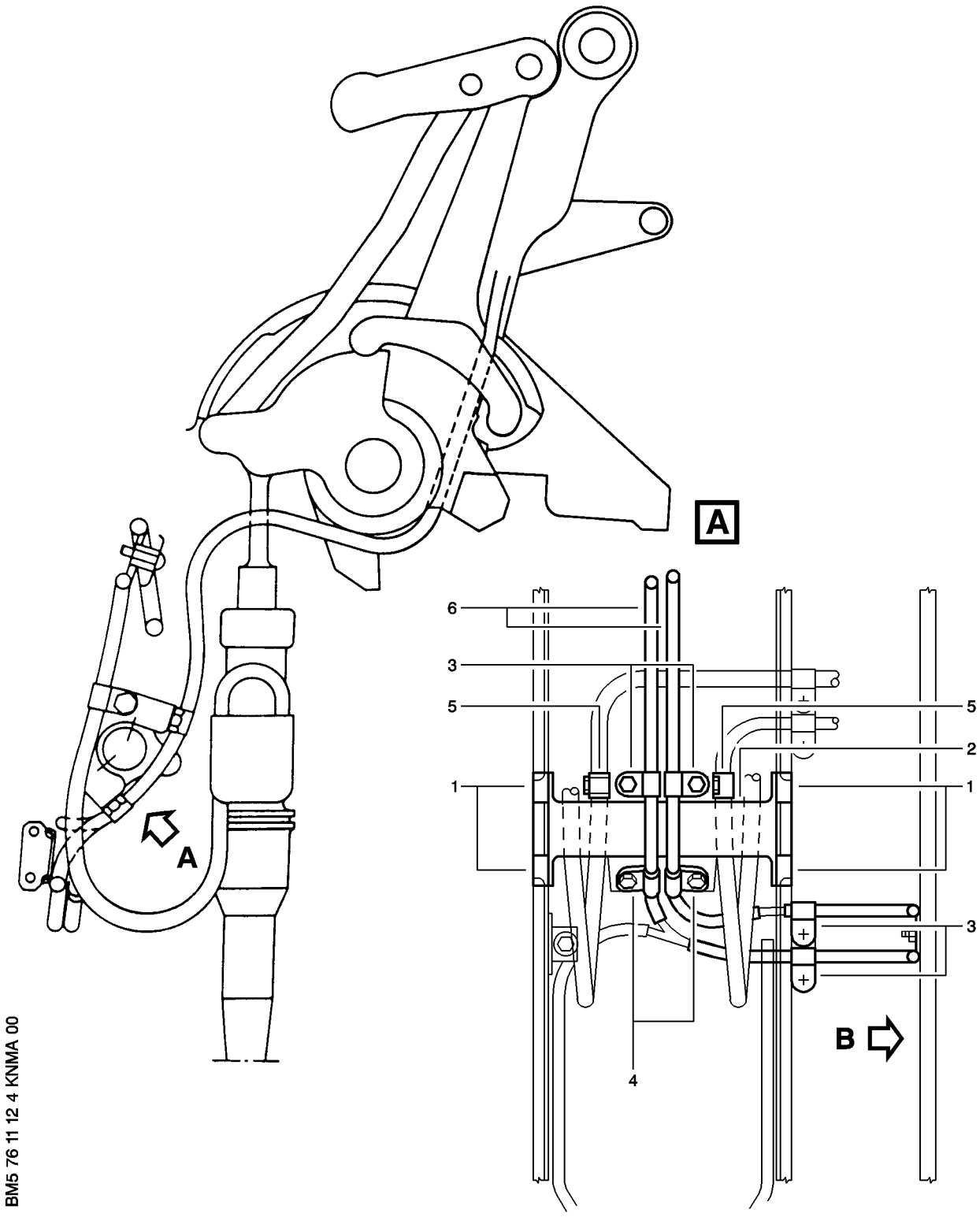
R

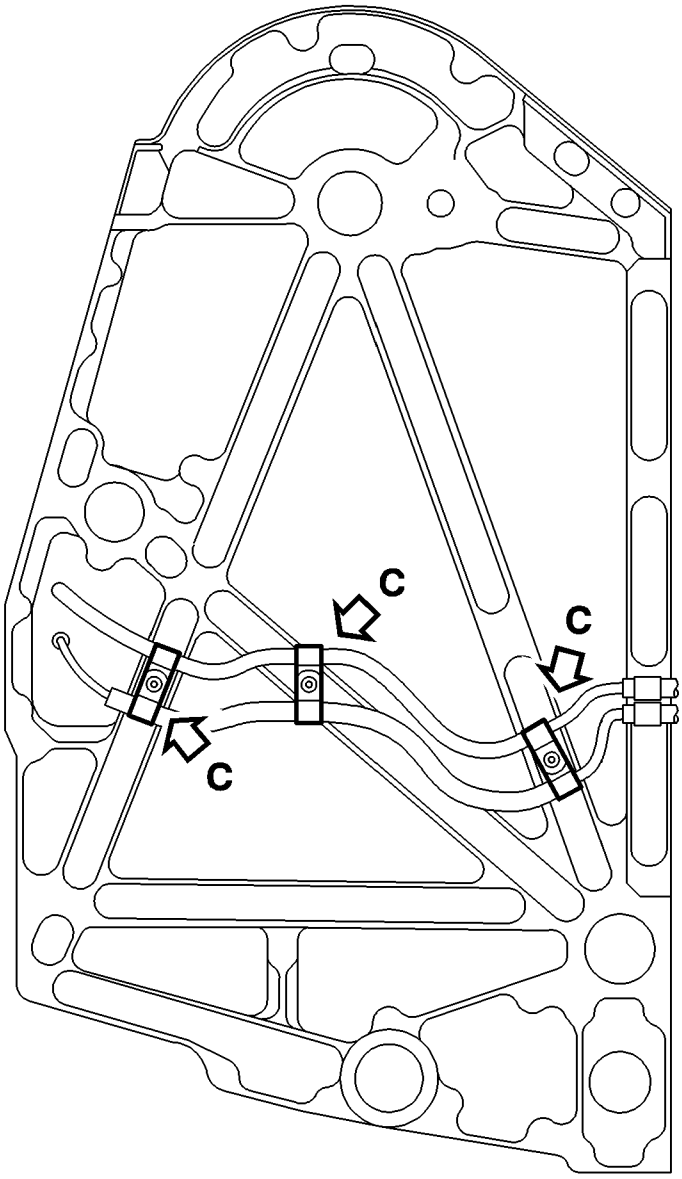
Uppers Covers
Figure 405



Dynamometric Rod Attachment
Figure 406



Electrical Routing (Sheet 1/2)
Figure 407



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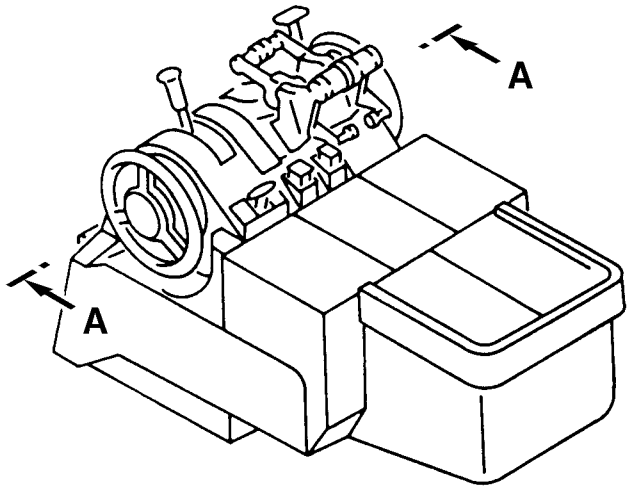
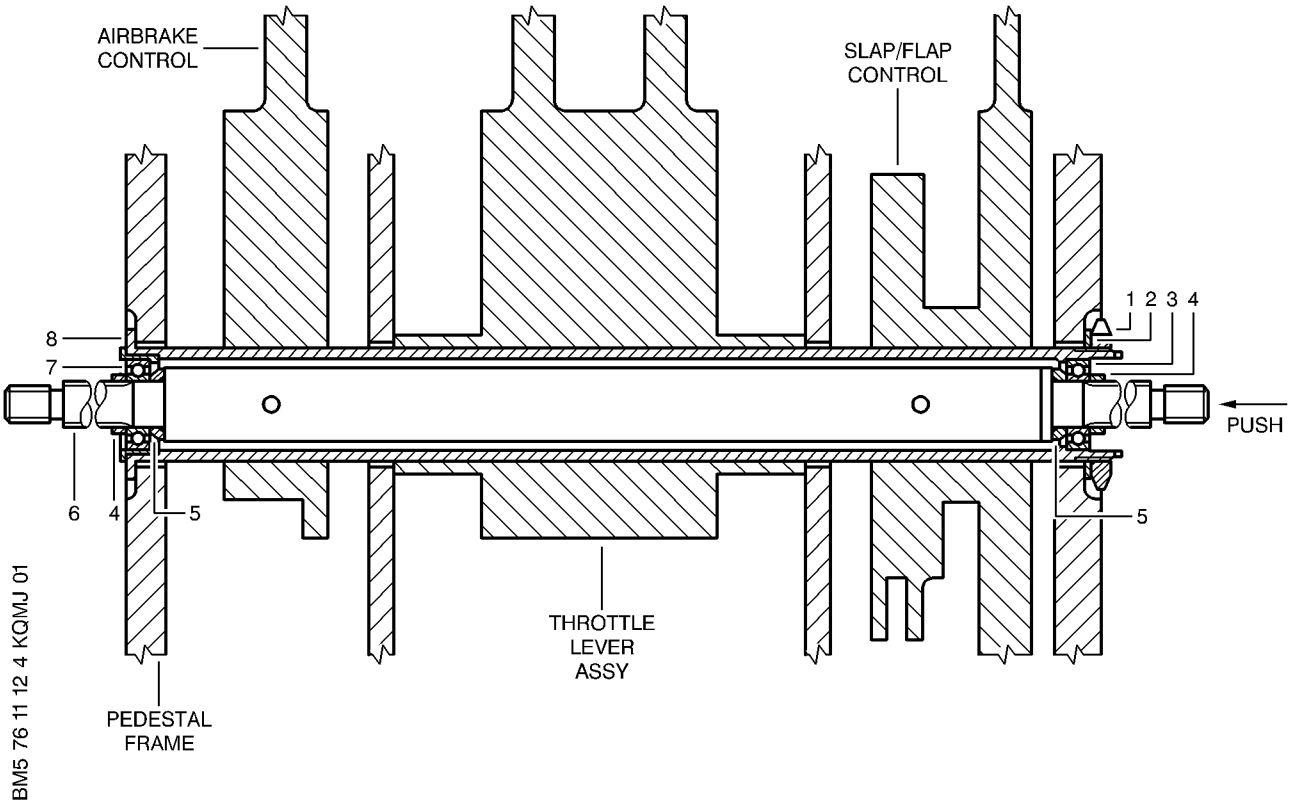
Electrical Routing (Sheet 2/2)
Figure 407

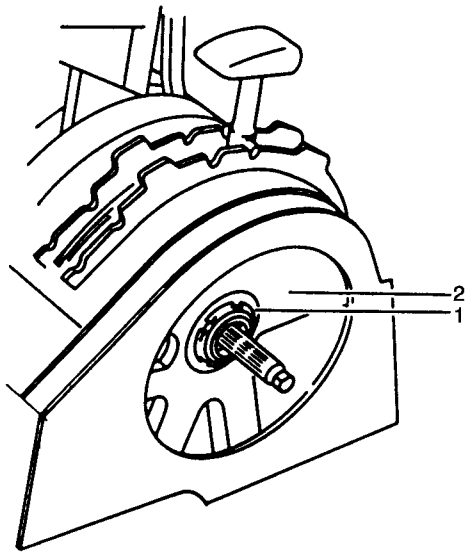


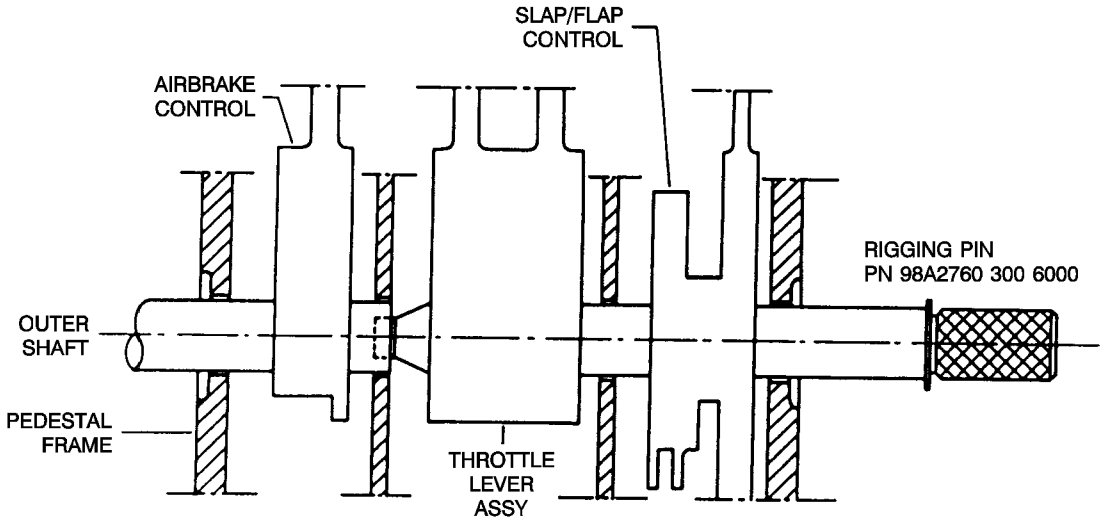
SECTION
A-A



Shafts Removal (Sheet 1/2)
Figure 408

R





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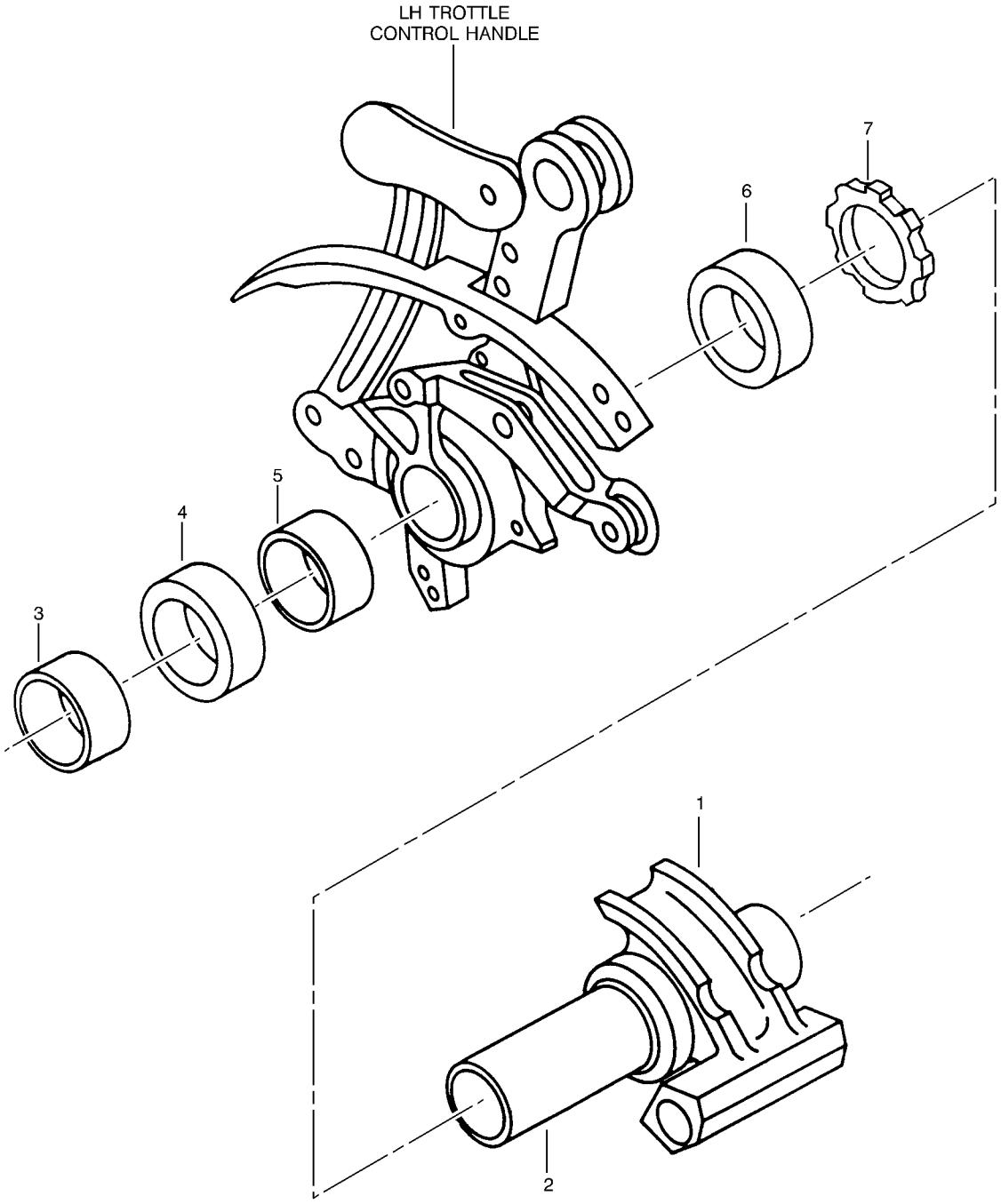
Shafts Removal (Sheet 2/2)
Figure 408

(a)Pull out each throttle control handle to remove them from the tubular support (2) and the stop (1).
NOTE : The two bearings remain into the throttle control lever.
(b)Remove the spacer (3), the bearing (4), the spacer (5), then the bearing (6).
NOTE : The bearings are installed tight fit and/or bonded.
R (c)Unlock and unscrew the slotted nut (7).
(2)Installation of throttle control bearings.
R (a)Install the slotted nut (7), the bearing (6) then the spacer (5),
R the bearing (4) and the spacer (3). TORQUE the slotted nut (7) to
R between 2 and 3 m.daN (14.7 and 22.1 lbf.ft) and wirelock.
(b)Reassemble the two throttle control handles on the tubular support (2) with the stop (1) installed.

E. Installation of Throttle Control Levers
(1)Position throttle control levers with rigging pin 98A27603006000.
(2)Put the harness in its initial position.
(3)Install the two clamps (4) (Ref. Fig. 407).
NOTE : Install the clamps (4) with two self-locking nuts instead of nuts and cotter pins (if installed).
(4)Install the spacer (2).
NOTE : Install the spacer (2) with six self-locking nuts (1) instead of nuts and cotter pins (if installed).
(5)Install the six clamps (8) attaching the two cables to frame.
NOTE : Install the six clamps with three self-locking nuts instead of nuts and cotter pins (if installed).
(6)Install adapters (9) and secure with screws (8) (Ref. Fig. 406).
(7)Connect dynamometric rods (Ref. Fig. 406).

(a)Position rod (6) at throttle lever connection and insert bolt (5).
(b)Install bush (4), washer (3) and nut (2).
(c)Tighten nut (2).
(d)Safety nut (2) with new cotter pin (1).
(e)Repeat steps (a) THRU (e) for other rod.
(8)Progressively install outer shaft at the same time removing shaft rigging pin 98A27603006000 (Ref. Fig. 408) (Sheet 2/2).
(9)Install washer (2) and slotted nut (1) using wrench 98A27603005000.
(10)TORQUE slotted nut (1) to 2 m.daN (14.75 lbf.in.) and wirelock.
(11)Install inner shaft (Ref. Fig. 408) (Sheet 1/2).
(12)Install upper covers (Ref. Fig. 405).
(a)Position speedbrake control cover (3) and install screws (1), (2), (4) and (5).
(b)Install the two brackets (17) onto the frame.
(c)Position throttle control cover (8) and install screws (6), (7), (9) and (10).
(d)Position flap control handle cover (12) and install screws (11), (13), (14) and (15).
(13)Install pin (9) and install the flap control lever handle with screw (8) (Ref. Fig. 404).
(14)Install the graduated gate (Ref. Fig. 404).
(a)Install graduated gate (7) and secure with screws (3) and (4).



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Throttle Control Lever Bearing
Figure 409

R

(b)Install position indexes (1) and (2) on throttle controls levers.
(c)Install screws (5) and (6).
(15)Install the identification plates (Ref. Fig. 403).
(a)Connect electrical connector to plate (2) and install screws (1).
(b)Connect electrical connector to plate (4) and install screws (3).
(16)Install the inside covers with three screws.
(17)Install right lower side panel (4) and secure with screws. (Ref. Fig. 401).
(18)Install side plate (3) supporting electrical connectors. Secure with the four screws and safety with 0.5 mm (0.02 in.) dia. lockwire.
(19)Remove blanking caps and connect electrical connectors to side plate (3).
(20)Install the three clamps (16).
(a)Install screw (18) together with washer (17).
(b)Install washer (15).
(c)Install nut (14), tighten and safety with 0.5 mm (0.02 in.) dia. lockwire.
(21)Install upper side panel (5) and secure with screws (19).
(22)Install side cover (2) and secure with screws (1).
(23)On LH side of center pedestal, repeat step (17) thru (22).
(24)Install the RH and LH pitch trim control wheel (Ref. 24-41-11, P. Block 401).
(25)Install First Officer's seat (Ref. 25-11-12, P. Block 401).
(26)Install Captain's seat (Ref. 25-11-11, P. Block 401).

F. Test and Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneaous items of equipment.
(2)Remove safety clips and tags, and close circuit breakers 306CJ1, 308CJ1, 305CJ1, 1JH, 2JH, 8JH, 1KG, 1KM, 2KM.
(3)Carry out functional test of pitch trim control mechanism (Ref. 27-41-11, P. Block 401).
(4)Carry out the TO/GA lever test (Ref. 22-10-00, P. Block 501).
(5)Carry out the test of start A and start B ignition system (Ref. 74-00-00, P. Block 501).
(6)Make certain that the throttle control levers move freely, without friction between fixed and moveable parts in the working area.
(7)Check throttle control effort and thrust reverser control lever effort (Ref. 76-11-00, P. Block 501).
(8)Make certain that throttle control levers are in idle position.

THROTTLE CONTROL LEVER - INSPECTION/CHECK

1. Inspection/Check of Throttle Control Assembly

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Brush
(2)	Vacuum Cleaner

B. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1 & 2/START/CTL & WARN	1KG	335/R68

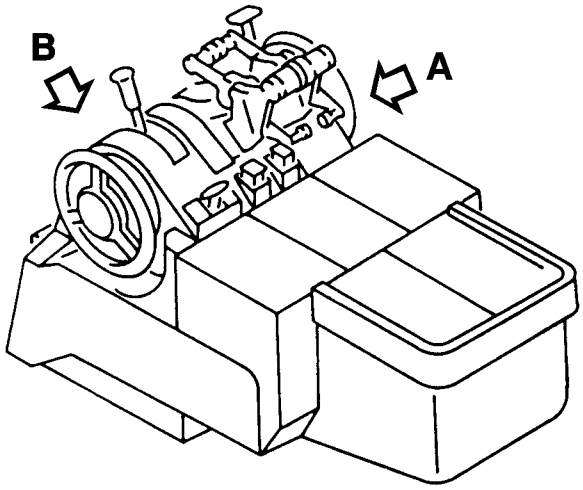
(2)Removal of the identification plates (Ref. Fig. 601).
  (a)Remove screws (1) and plate (2).
  (b)Remove screws (3) and plate (4).
  (c)Remove screw (8) and plate (9) (Ref. Fig. 602).
(3)Removal of the graduated gate (Ref. Fig. 602).
  (a)Remove and retain screws (5) and (6).
  (b)Remove position indexes (1) and (2).
  (c)Remove screws (3) and (4) and graduated gate (7).
(4)Removal of the inside covers (10) from the throttle control levers (Ref. Fig. 602).
  (a)Remove the three screws attaching each inside cover (10) to lever.
  (b)Remove the cover.
(5)Removal of the upper cover (Ref. Fig. 603).
  (a)Remove screws (1), (2), (4) and (5). Remove throttle control cover (3).

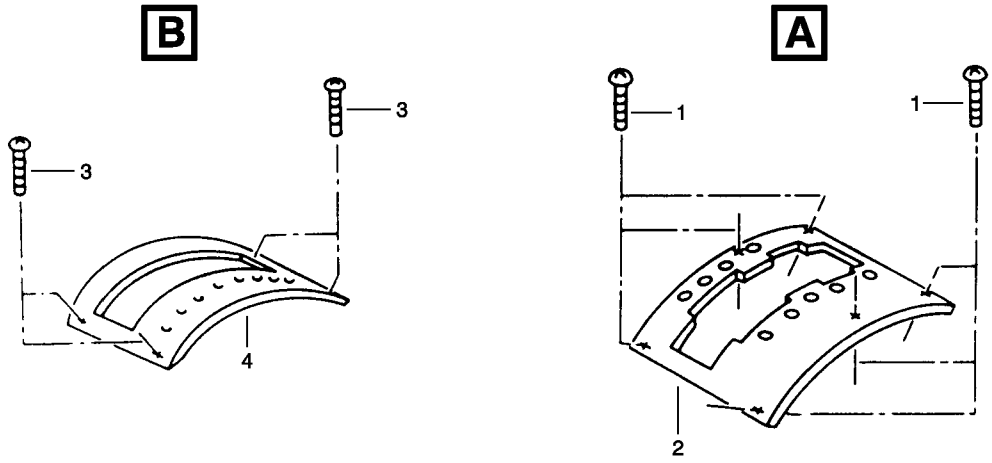
C. Cleaning and Inspection Procedure

(1)Clean the throttle control assembly inside the center pedestal, with a brush and a vacuum cleaner.
(2)Inspect the throttle control assembly for potential corrosion, rubbing traces of wear and degradation.

D. Close-Up

(1)Install upper cover (Ref. Fig. 603).
  (a)Position throttle control cover (3) and install screws (1), (2), (4) and (5).
(2)Install the graduated gate (Ref. Fig. 602).
  (a)Install graduated gate (7) and secure with screws (3) and (4).
  (b)Install position indexes (1) and (2) on throttle control levers.
  (c)Install screws (5) and (6).





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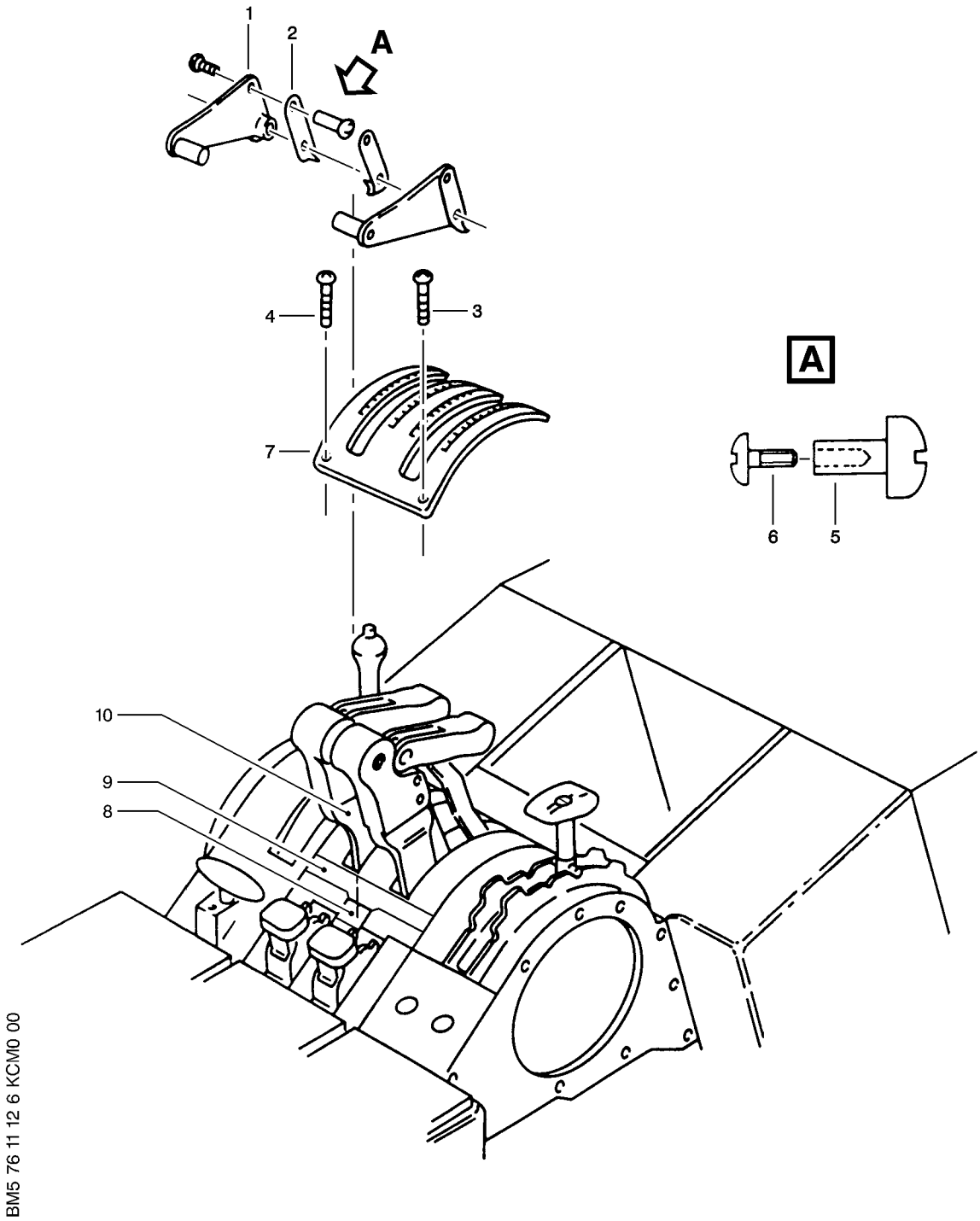
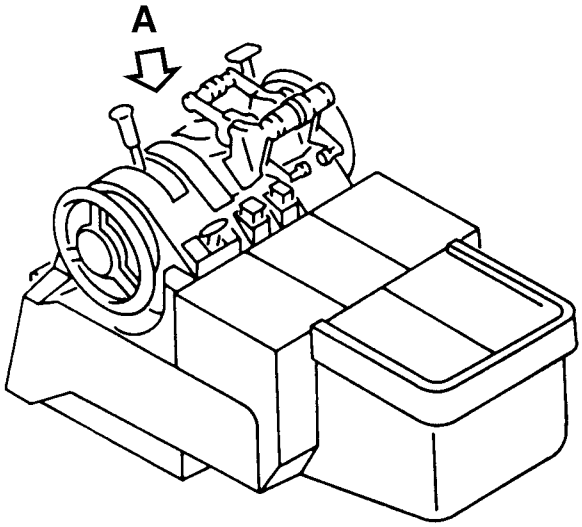
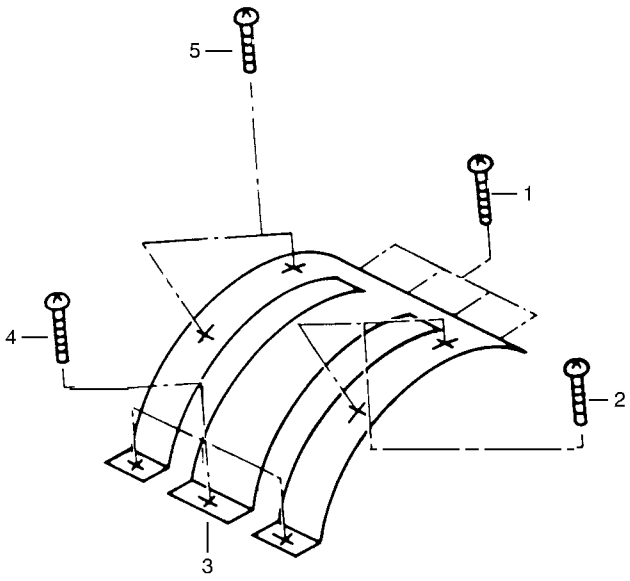
Identification Plates
Figure 601



Graduated Gate
Figure 602





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Upper Cover
Figure 603

(3)Install the identification plates (Ref. Fig. 601).
  (a)Connect electrical connector to plate (2) and install screws (1).
  (b)Connect electrical connector to plate (4) and install screws (3).
  (c)Connect electrical connector to plate (9) and install screw (8) (Ref. Fig. 602).
(4)Install the inside covers with three screws.
(5)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(6)Remove safety clips and tags, and close circuit breakers 1JH, 2JH, 8JH, and 1KG.
(7)Proceed with several complete cycles of throttle control lever and check that there is no friction point or binding in complete throttle and thrust reverser control lever travel.
(8)Make certain that throttle control levers are in idle position.

DYNAMOMETRIC ROD - REMOVAL/INSTALLATION

WARNING : BEFORE ATTEMPTING ANY MAINTENANCE PROCEDURES ON CENTER CONTROL PEDESTAL, MAKE CERTAIN THAT WARNING NOTICES AND SAFETY BARRIERS ARE IN PLACE.

NOTE : Dynamometric rods being identical, only one removal/installation is described.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms
B. 98A27901005000	Pin Rigging Cable Tension Regulator
C. 99A76101003000	Pin - Rigging Microswitch Unit
D. 72-5-644	Retaining Fork - Dynamometric Rod
E.	Circuit Breaker Safety Clips
F.	Corrosion - Resistant Steel Lockwire
G.	Blanking Plugs/Caps
H.	Warning Notice
Referenced Procedures	
- 22-10-00, P. Block 501	Autopilot
- 22-30-00, P. Block 501	Autothrottle Control
- 25-11-12, P. Block 401	First Officer Seat
- 25-11-12, P. Block 501	First Officer Seat
- 27-41-11, P. Block 401	Pitch Trim Control Mechanism
- 29-10-00, P. Block 301	Main Hydraulic Power
- 74-00-00, P. Block 501	Ignition - General

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SYS 1/28VDC	306CJ1	102/H 8
21VU	AFS/TCC/SYS 1/115VAC	308CJ1	102/H 9
21VU	AFS/TCC/SENSORS	305CJ1	102/H10
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1 & 2/START/CTL & WARN	1KG	335/R68

(2)Position access platform at forward cargo compartment.

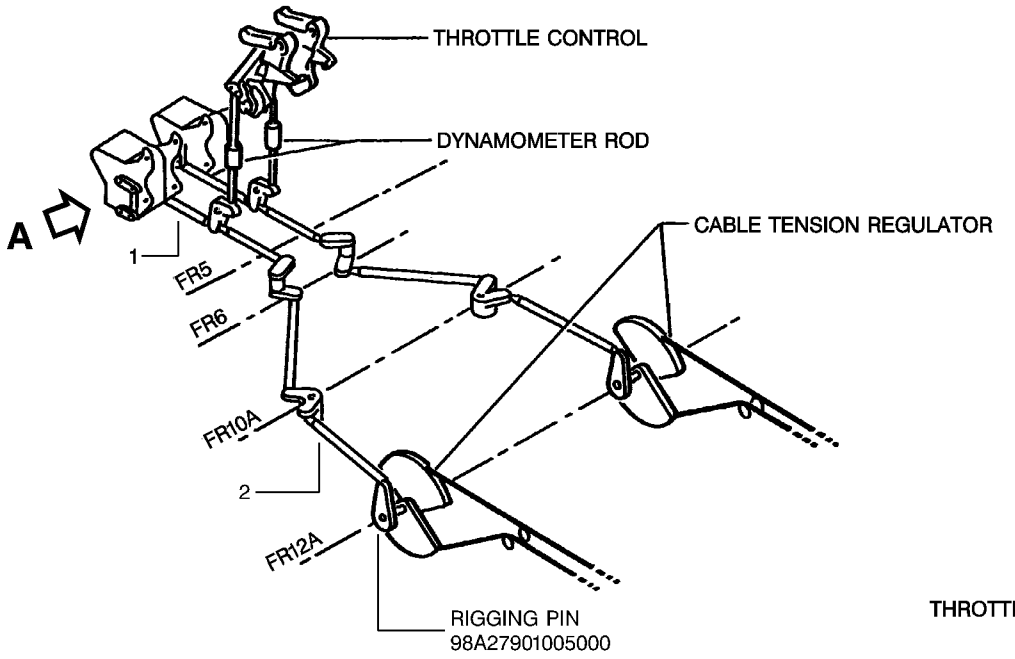
(3)On panel 429VU and 9VU.

- Display a warning notices prohibiting operation of throttle control levers, pitch trim control wheel, and flap and slat control lever.

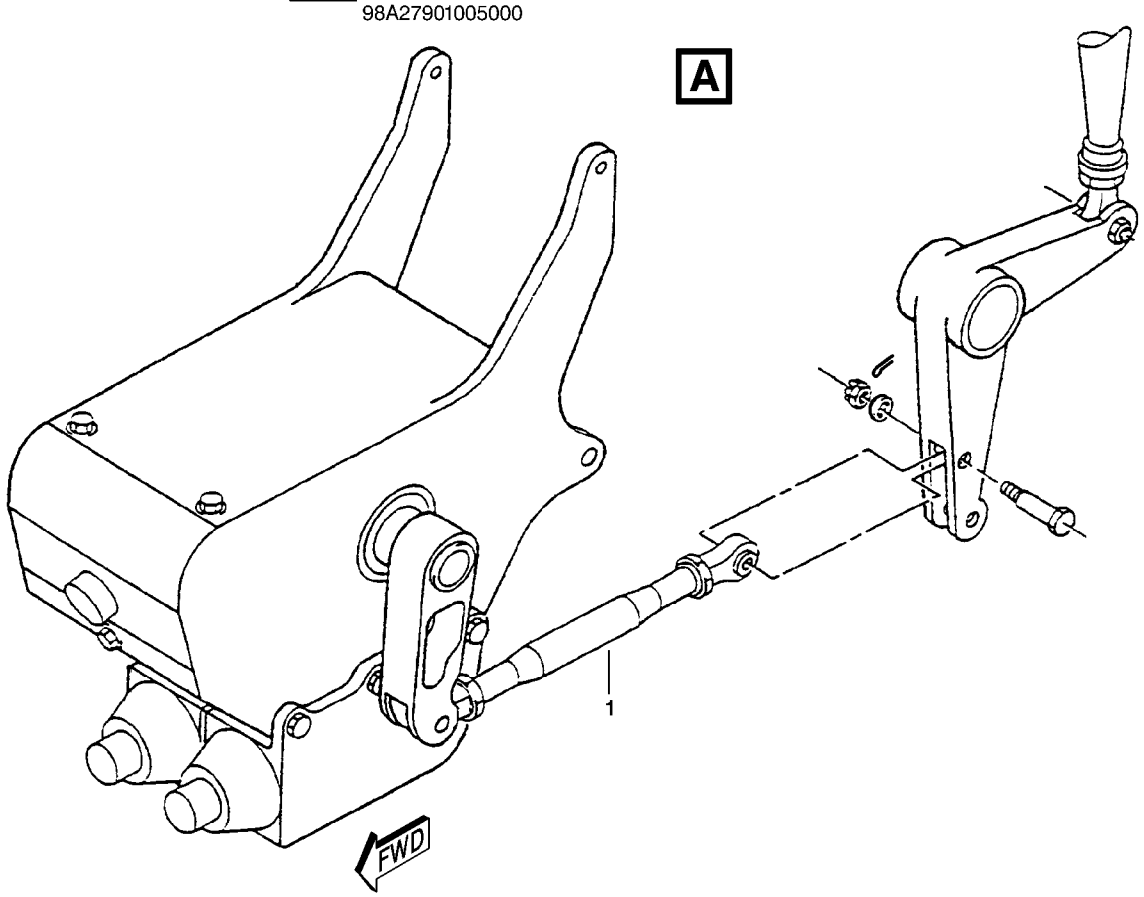
(4)Remove First Officer's seat (Ref. 25-11-12, P. Block 401).
(5)In avionics compartment, open access door 121BL.
(6)Depressurize the following hydraulic systems (Ref. 29-10-00 P. Block 301).

(Ref. Fig. 401)

B. Removal
(Ref. Fig. 402)
NOTE : Before removal, make certain that ENG 1 and ENG 2 HP fuel shut-off valve control levers are in OFF position.
(1)Remove right pitch trim control wheel (Ref. 27-41-11, P. Block 401).
(2)Remove screws (20) and side cover (21).
(3)Remove screws (17) and upper side panel (24).
(4)Remove side plate (22) fitted with electrical connectors.
(a)Disconnect and cap connectors.
(b)Cut and remove lockwire, remove and retain the four screws together with washers.
(c)Cut and remove lockwire, remove and retain nut (3) together with washer (4).
(d)Remove screw (7) together with washer (6), remove the three clamps (19). Retain these parts for installation.
(5)Remove screws (18) and remove lower side panel (23).
(6)At upper part of center pedestal, remove position indexes (1) and (2) from throttle control levers (14).
(a)Remove and retain screws (33) and (34).
(b)Remove position indexes (1) and (2).
(7)Remove the three screws attaching the inside cover (31) to lever. Remove the cover.
(8)Remove screws and casing (32) protecting throttle control levers (14).
(9)Remove the two screws attaching the ON-FUEL-OFF plate (30). Remove the plate.
(10)Disconnect connector (15) from dynamometric rod ; cap plug and receptacle.
(11)Remove the three cable clamps (26).
(a)Remove and discard cotter pin (29).
(b)Remove and retain nut (28) together with washer (27).
(c)Remove and retain screw (25) and clamp (26).
(12)Remove dynamometric rod attaching parts, commencing with lower attachment, then upper attachment.
(a)Check that throttle control lever and the thrust reverser control lever are in FIT position.
(b)At lower attachment, remove and discard the cotter pin (9).
(c)Remove and retain the nut (8) together with the washer (10).
(d)Move the thrust reverser control lever in RFT position.
(e)Remove the bolt (13) together with spacer (12).
(f)At upper attachment, remove and discard the cotter pin (9).
(g)Remove and retain the nut (8) together with the washer (10).
(h)Remove the bolt (13) together with spacer (12).
(13)Disengage dynamometric rod from yoke fittings (11), commencing with lower fitting.



THROTTLE CONTROL LINKAGE



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Component Location
Figure 401

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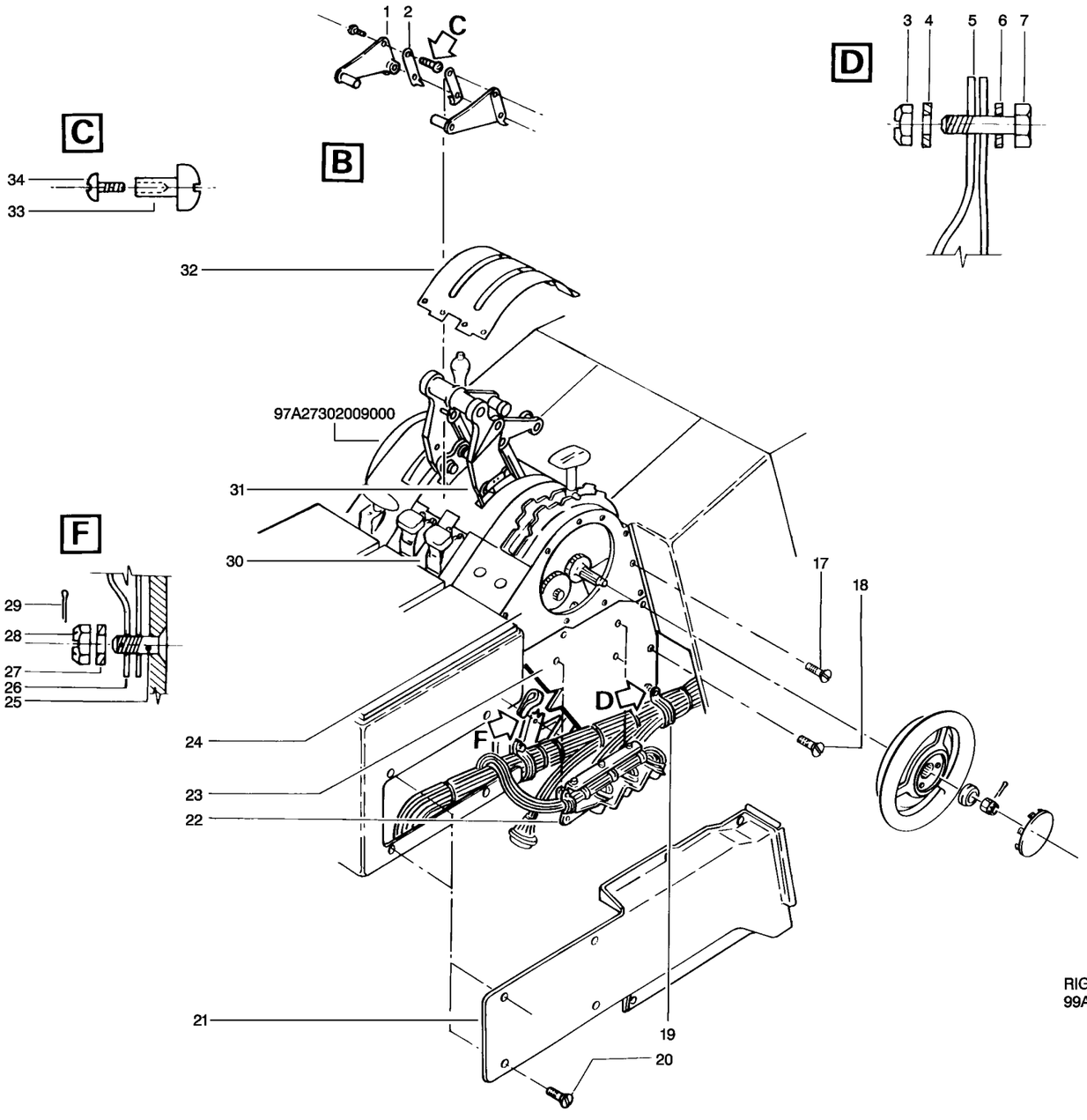


Dynamometric Rod
Figure 402

BM5 76 11 21 4 KCM0 01

C. Preparation of Replacement Component
(1)Make certain that replacement component is clean and free from damage or corrosion.
(2)Make certain that replacement component is fitted with retaining fork item 72-5-644.

D. Installation
(Ref. Fig. 402)
(1)Pivot lever (14) as in RFT position, and lever (16) counter clockwise.
(2)Engage lower eye-end fitting of dynamometric rod in yoke fitting (11).
(3)Install the lower attachment of dynamometric rod.
(a)Install the bolt (13) together with spacer (12).
(b)Install washer (10), nut (8) and safety with cotter pin (9).
(4)Position the upper eye-end fitting of dynamometric rod in yoke fitting (11).
(5)Install the upper attachment of dynamometric rod.
(a)Install the bolt (13) together with spacer (12).
(b)Install washer (10), nut (8) and safety with cotter pin (9).
(6)Pivot lever (14) as in FIT position and make certain that control lever is immobilized in FIT position.
(7)Install rigging pin 99A76101003000 in microswitch unit 112VU (113VU).
(8)If the rigging is not correct, adjust length of ajustable rod (1) (Ref. Fig. 401).
(9)On cable tension regulator corresponding to dynamometric rod removed, install the rigging pin 98A27901005000.
(10)If the rigging is not correct, adjust length of ajustable rod (2) (Ref. Fig. 401).
(11)Remove the rigging pins from the cable tension regulator and the microswitch unit.
(12)Install the three clamps (26) to hold rod cables.
(a)Install screw (25).
(b)Install clamp (26) together with washer (27).
(c)Install and tighten nut (28) and safety with cotter pin (29).
(13)Remove blanking caps, connect electrical connector (15).
(14)Remove dynamometric rod retaining fork item 72-5-644.
(15)Install right lower side panel (23) and secure with screws.
(16)Install side plate (22) supporting electrical connectors. Secure with the four screws and safety with 0.5 mm (0.02 in.) dia. lockwire.
(17)Remove blanking caps and connect electrical connectors to side plate (22).
(18)Install the three clamps (19).
(a)Install screw (7) together with washer (6).
(b)Install washer (4).
(c)Install nut (3), tighten and safety with 0.5 mm (0.02 in.) dia. lockwire.
(19)Install upper side panel (24) and secure with screws (17).
(20)Install side cover (21) and secure with screws (20).
(21)Install right pitch trim control wheel (Ref. 27-41-11, P. Block 401).
(22)Install casing (32) protecting throttle control levers (14) and secure with screws.
(23)Install position indexes on throttle control levers (14).

(a)Install position index (1) and secure with screw (33).
(b)Install position index (2) diametrically opposed and secure with screw (34).
(24)Install the ON-FUEL-OFF plate (30) and tighten the two screws.
(25)Install the inside cover (31) on to the lever and tighten the three screws.

E. Test
(1)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)Remove safety clips and tags, and close circuit breakers 308CJ1, 306CJ1, 305CJ1, 1JH, 2JH, 8JH, 1KG, 1KM and 2KM.
(3)Carry out operational test of autothrottle control (Ref. 22-30-00, P. Block 501).
(4)Carry out the TO/GA lever test (Ref. 22-10-00, P. Block 501).
(5)Carry out the test of start A and start B ignition system (Ref. 74-00-00, P. Block 501).

F. Close-Up
(1)Install First Officer's seat (Ref. 25-11-12, P. Block 401) and carry out operational test (Ref. 25-11-12, P. Block 501).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Make certain that the throttle control levers move freely without friction between fixed and moveable parts in the working area.
(4)In avionics compartment, close access door 121BL.
(5)Remove warning notices.
(6)Remove access platforms.
(7)Make certain that throttle control levers are in idle position.

THROTTLE CONTROL MICROSWITCH UNIT - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON MICROSWITCH UNIT, THROTTLE CONTROL LEVERS SHALL BE IMMOBILIZED IN IDLE POSITION. AS A SAFETY PRECAUTION, DISPLAY A WARNING NOTICE ON THE LEVERS.

NOTE : Removal/installation procedures for both left and right microswitch units are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, Forward Cargo Compt 2.70 in (9 ft.)
B. 99A76101003000	Pin-Rigging, Throttle Control Microswitch Unit
C. 98A27901005000	Pin-Rigging, Cable Tension Regulator
D. 97A76102500002	Quadrant - Graduated Throttle and Thrust Reverser Control
E. 35M5M01140001	Test Set - Thrust Reverser Microswitch
F.	Circuit Breaker Safety Clips
G.	Cotter Pins
H.	Corrosion Resistant Steel Lockwire Dia. 0.032 in. (0.813 mm)
J.	Blanking Plug/Caps
K.	Warning Notices
Referenced Procedures	
- 21-31-00, P. Block 501	Cabine Pressure Control and Monitoring
- 22-33-16, P. Block 401	Throttle Position Detectors
- 24-41-00, P. Block 301	AC External Power Control
- 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speed - Brakes)

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SYS1/28VDC	306CJ1	102/H 8
21VU	AFS/TCC/SYS1/115VAC	308CJ1	102/H 9
21VU	AFS/TCC/SENSOR	305CJ1	102/H10
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1 & 2/START/CTL & WARN	1KG	335/R68

(2)Position access platform at FWD cargo compartment door.

(3)Open access door 121BL.

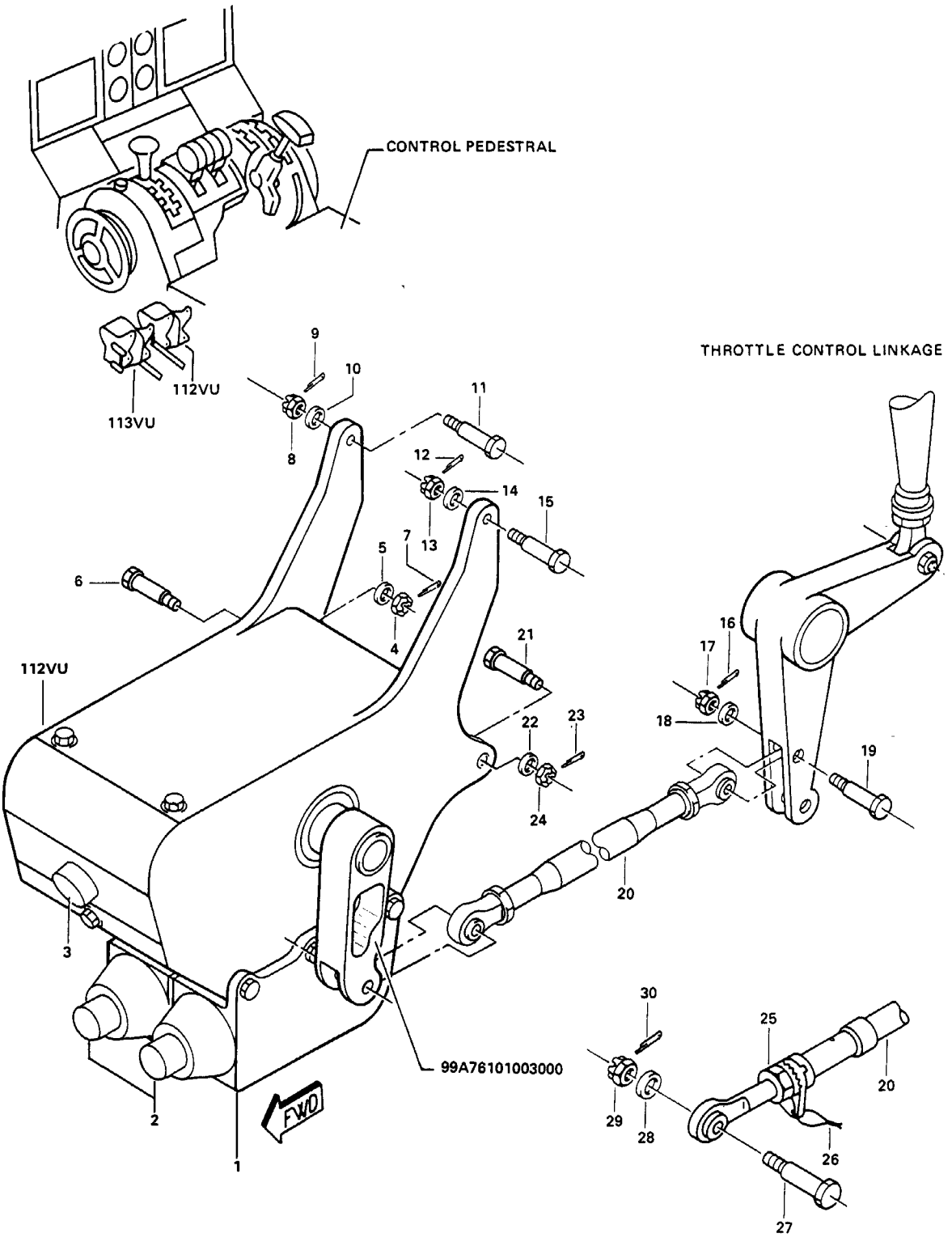
(4)Install a warning notice prohibiting throttle control lever operation panels 429VU and 9VU.
(5)On cable tension regulator corresponding to microswitch unit to be removed, install rigging pin 98A27901005000.

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connectors (2) and (3) from microswitch unit (1) and cap electrical connectors.
(2)Remove and discard cotter pin (16), remove nut (17), washer (18), bolt (19) and disengage rear end of link rod.
(3)Remove and discard cotter pins (7), (12), (9) and (23).
(4)Remove nuts (4), (8), (13) and (24), washers (5), (10), (14) and (22), bolts (6), (11) (15) and (21).
(5)Remove and discard cotter pin (30), remove nut (29), washer (28) and bolt (27).
(6)Disengage ink-rod (20) from the yoke of microswitch unit input bellcrank.
(7)Check attach fittings and linkage for correct condition and security of attachment and make certain that they are free from traces of wear or corrosion.

C. Preparation of Replacement Component
(1)Make certain that replacement component is clean and free from corrosion or cracks.
(2)Clean mounting area check attach fittings for corrosion or cracks.

D. Installation (Ref. Fig. 401)
(1)Engage end of rod (20) in microswitch unit yoke input bellcrank.
(2)Install bolt (27), washer (28) and nut (29). Tighten and safety with new cotter pin (30).
(3)Attach microswitch unit using bolts (6), (11) (15) and (21), washers (5), (10), (14) and (22), nuts (4), (8), (13) and (24). Safety with new cotter pins (7), (9), (12) and (23).
(4)Engage end of rod (20) in link rod, install bolt (19), washer (18), nut (17). Tighten and safety with new cotter pin (16).
(5)Connect electrical connectors (3) and (2) from microswitch unit (1).

E. Adjustment (Ref. Fig. 401)
(1)Make certain throttle control levers are immobilized in IDLE position.
(2)Make certain that rigging pin 99A76101003000 can be installed in microswitch unit. If not, proceed as follows:
R NOTE : To insert pin, move the opposite throttle control lever forward,
R at approximately 25°.
(a)Cut and remove lockwire (26) from both ends of link rod (20).
(b)Loosen lock-nut (25) and separate serrated washers at both ends of link rod (20).
(c)Turn body of link rod (20) until rigging pin 99A76101003000 fits correctly.
(d)Check that rigging remains correct after tightening lock nuts (25).
(e)Through the witness hole, check that the threaded and engages correctly in link rod (20).



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Throttle Control Microswitch Unit
Figure 401

R

F. Throttle Position Detectors 313CJ and 314CJ Removal/installation and Adjustment/Test (Ref. AMM 22-33-16, P. Block 401)

R NOTE : This procedure is mandatory after all removals and replacements
R of either the complete Throttle Control Microswitch Unit
R (including Throttle Position Detector), or the separate Throttle
R Position Detector. Often the complete combined assembly is out of
R rig at either end, therefore both sides must be rigged per this
R procedure.

G. Test (Ref. Fig. 403, 402)

(1)Initial conditions

R (a)Remove rigging pins 99A76101003000 and 98A27901005000.
(b)Remove safety clips and tags and close circuit breakers 306CJ1, 308CJ1, 305CJ1, 1JH, 2JH, 1KG, 1KM and 2KM.
(c)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Make certain that electronics racks ventilation is correct.
(e)Install tool 97A76102500002.

(2)Procedure

ACTION	RESULT
1. Move throttle control levers to check that spoilers can be extended	- Perform Functional Test : "Ground spoiler test" (Ref. 27-61-00, P. Block 501).
NOTE : The spoilers can be extended when both throttle control levers are in a position between idle and 10°.	
2. Move ENG 1 throttle control lever to check that cabin pressurization operates correctly (Normal take off phase)	- Perform Operational Test : "Test of Pressurization and Depressurization Electrical Sequences" (Ref. 21-31-00, P. Block 501).
NOTE : When one throttle control levers reaches 22° increasing, the cabin may be pressurized at take off.	
3. Retard throttle control lever to check that cabin depressurizes (Normal landing phase)	- Perform Operational Test : "Test of Pressurization and Depressurization Electrical Sequences" (Ref. 21-31-00, P. Block 501).
NOTE : When both throttle control levers reach 22° decreasing, the cabin may be depressurized at landing (opening of the four outflow valves).	
4. Repeat steps 2. and 3. with ENG 2 throttle control lever.	
5. Disconnect connectors 577VC from 113VU and 578VC from 112VU. Connect Test Set 35M5M01140001 to both microswitch units as identified on cable.	

ACTION	RESULT
6. On test set : - place **ON/OFF** switch in **ON** position - push **LIGHT TEST** pushbutton switch - make certain that the eight lights come on.	
7. Place both throttle control levers in **FIT** position.	- Check that lights on test set indicate the **OPEN** position (lights on) for microswitches **13KM** and **14KM** and do not indicate **CLOSED** position (lights off) for **7KM** and **8KM**.
8. Actuate both thrust reverser control levers - Deploy phase before interlock stop and before 41° of thrust reverser control levers - Stow phase after friction point (reverse idle detent) and between 28°30' and 20°30' of thrust reverser control levers.	- Check that lights : . Indicate **CLOSED** position for microswitches **13KM** and **14KM** and then **7KM** and **8KM** (Normal Sequence). . Do not indicate **CLOSED** position (lights off) for microswitches **7KM** and **8KM** and then indicate **OPEN** position (lights on) for **13KM** and **14KM** (Normal Sequence).

H. Close-Up

(1)Safety lock-nut (25) at both ends of link rod (20) with 0.032 in. (0.813 mm) corrosion-resistant steel lockwire (26).

(2)Turn off equipment. De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Remove tools **97A76102500002** and **35M5M01140001** and connect **577VC** and **578VC**.

(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

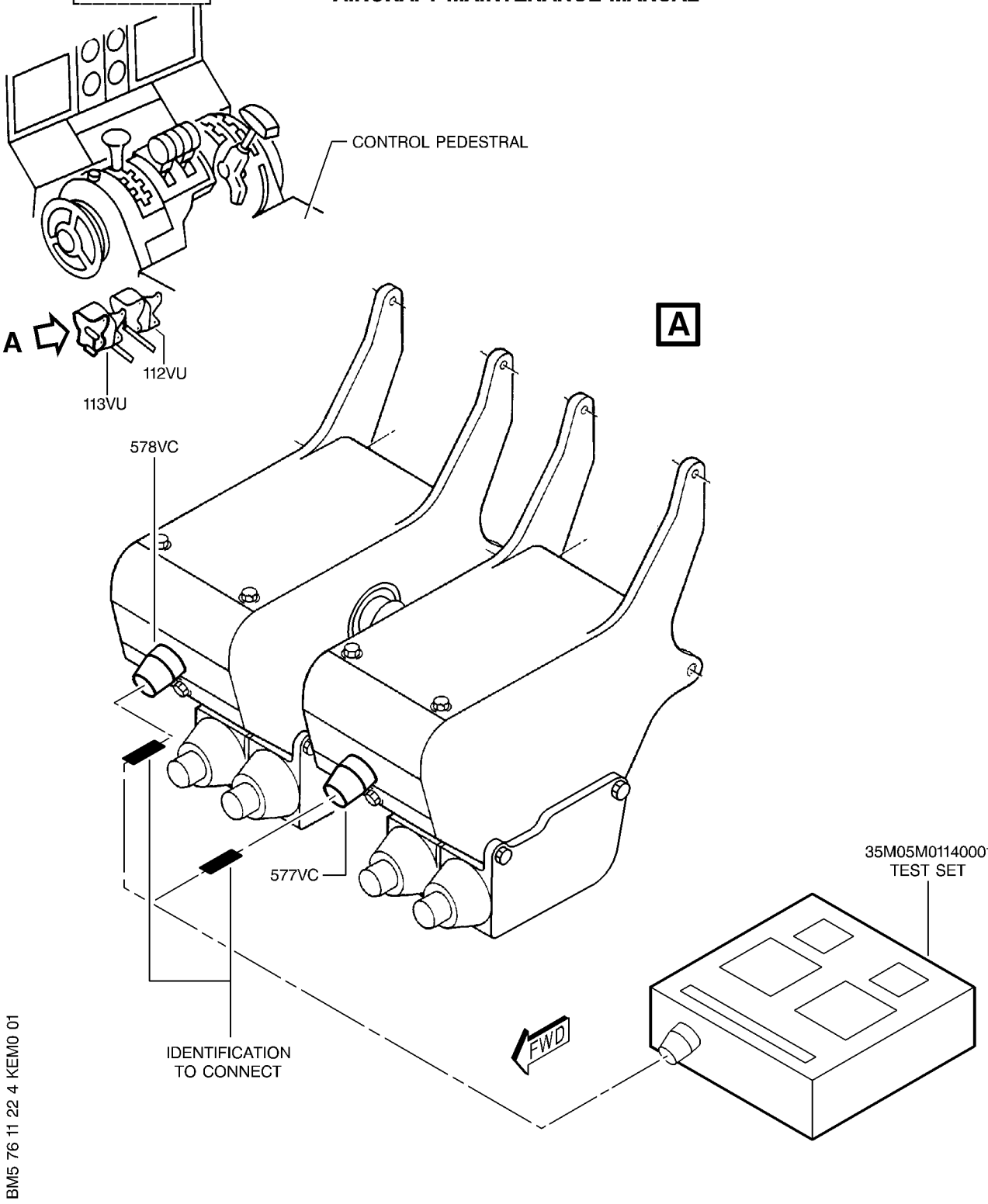
(5)Carry out a complete cycle of the throttle control to make certain that there is no binding. Make certain that there is no friction at the microswitch unit.

(6)Close access door **121BL**.

(7)Remove warning notices.

(8)Remove access platform.

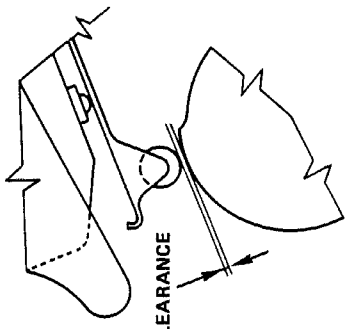
(9)Make certain that throttle control levers are in idle position.



Test Set Installation
Figure 402

R

CAUTION :
WITH MICRO SWITCH AGAINST ITS STOP CHECK CLEARANCE BETWEEN ROLLER AND CAM THAT SHOULD BE 0,2 ⩽ CLEARANCE ⩽ 0,3.



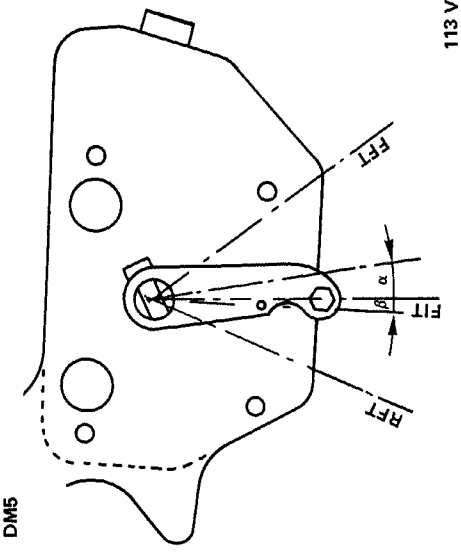
POSITION OF REVERSING ROLLER AGAINST ITS STOP

113 VU AND 112 VU BOXES REVERSING MICRO-SWITCH SETTING

THROTTLE HANDLE TRAVEL		REVERSING MICRO SWITCH	ELECTRICAL MARKINGS 113 VU	ELECTRICAL MARKINGS 112 VU	CAM α TRAVEL		NATURE OF THE SHOP	ACTING DIRECTION FOR SETTING
10°		A1 A2	9 CS 51 CS	8 CS 52 CS	7°12'40"		FULL IDLE	TOWARDS F.F.T.
22°		B1	45 HM	44 HM	15°49'		PRESSURE GOVERNING	TOWARDS F.F.T.
REVERSE HANDLE TRAVEL		B2	13 KM	14 KM	CAM β TRAVEL	CAM TRAVEL < 3°40'	REVERSERS SPREADING OUT	R.I. TOWARDS R.F.T.
	REVERSE HANDLE TRAVEL < 41°							
	20° 30' < REVERSE HANDLE < 28°30' TRAVEL				30° < CAM < 1°30' TRAVEL			R.F.T. TOWARDS R.I. (HANDLE RETURN)
REVERSE HANDLE TRAVEL < 41°		B3	7 KM	8 KM	CAM TRAVEL < 3°40'			R.I. TOWARDS R.F.T.
	20°30' < REVERSE HANDLE < 28°30' TRAVEL				30° < CAM < 1°30' TRAVEL			R.F.T. TOWARDS R.I. (HANDLE RETURN)

NOTE : ALL MICRO-SWITCHES WILL ROCK ON THE WORKING POSITION FOR THEIR NOMINAL SETTING VALUE MICRO-SWITCH SETTING ACCURACY WILL BE : ± 1°

THE ORIGINE OF ALL THE ANGULAR VALUES ABORE DEFINED IS THE «0 POSITION»



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DM5

Throttle Control Microswitch Unit Adjustment
Figure 403

LH AND RH CABLE TENSION REGULATOR - REMOVAL/INSTALLATION

CAUTION : BEFORE ATTEMPTING REMOVAL/INSTALLATION PROCEDURES FOR CABLE TENSION REGULATOR, MAKE CERTAIN THROTTLE CONTROL LEVERS ARE IMMOBILIZED IN "IDLE" POSITION. AS A SAFETY PRECAUTION, DISPLAY A WARNING NOTICE ON THE LEVERS AND ON ENGINE START PANEL 429VU.
RIGGING PINS WILL BE FITTED TO MICROSWITCH UNIT AND AUTOTHROTTLE COUPLING UNIT.

NOTE : Removal/Installation procedures are identical for both LH and RH cable tension regulators.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms
B. 99A76101003000	Pin-Rigging, Throttle Control Microswitch Unit
C. 98A76101003000	Pin-Rigging, Autothrottle Coupling Unit
D. 98A27901005000	Pin-Rigging, Cable Tension Regulator
E. 98A76103000000	Bar - Locking, Throttle Control, Cable Tension Regulator "O" Position
F.	Ambient Temperature Thermometer
G.	Circuit Breaker Safety Clips
H.	Safety Clips - Turnbuckles
I. Material No. 08-002	Bonding and Adhesive Compounds (Ref. 20-31-00)
J.	Warning Notice
Referenced Procedure	
- 76-11-00, P. Block 501	Throttle Controls

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SYS1/28VDC	306/CJ1	102/H 8
21VU	AFS/TCC/SYS1/115VAC	308/CJ1	102/H 9
21VU	AFS/TCC/SENSORS	305/CJ1	102/H10
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1 & 2/START/CTL & WARN	1KG	335/R68

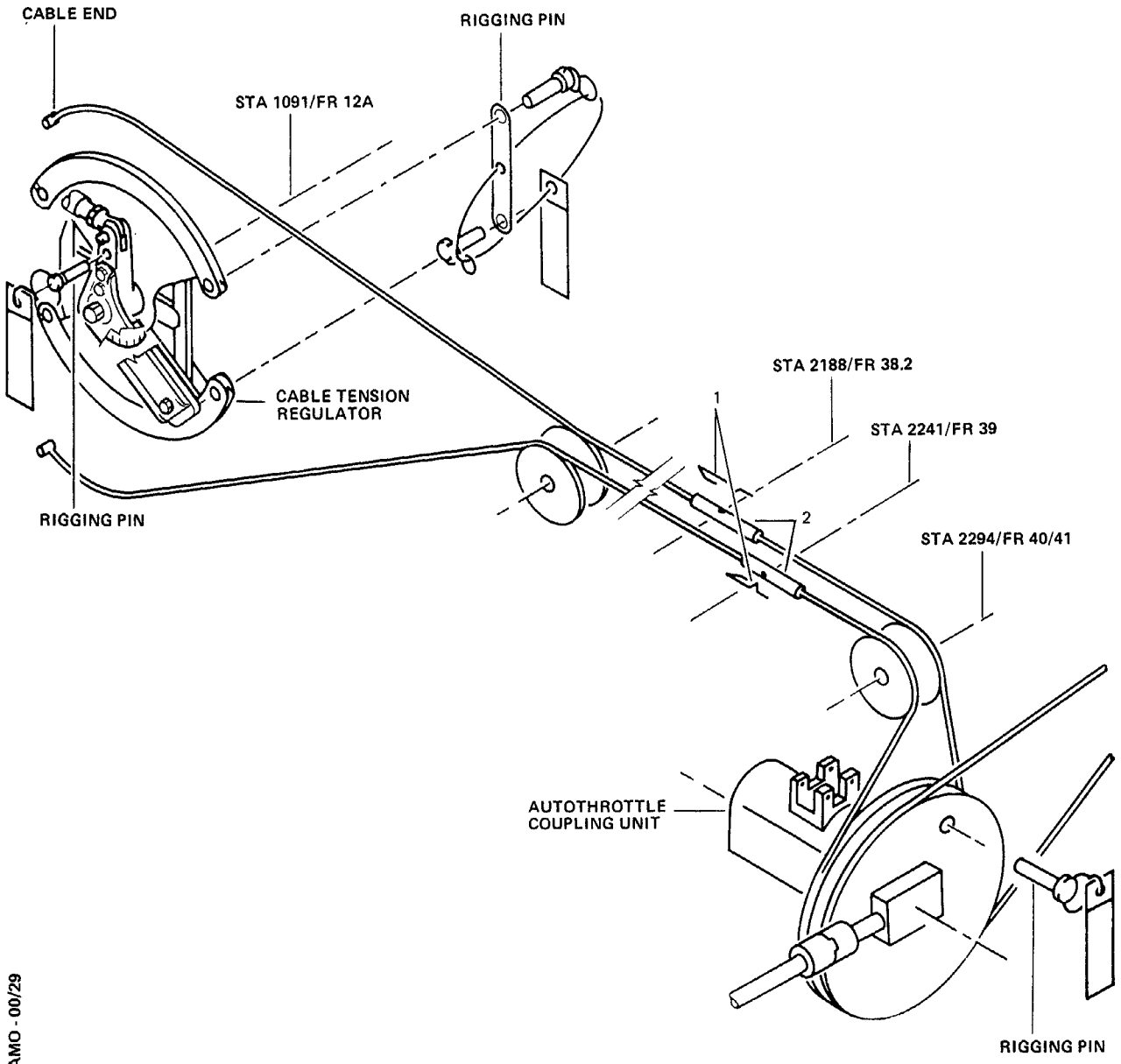
(2)Position access platform at FWD cargo compartment door. Open FWD cargo compartment door then doors 131SW (132SW) giving access to avionics compartment.

(3)On panel 429VU, install a warning notice prohibiting throttle control

levers operation.
(4)Check that rigging pin 99A76101003000 can be installed in microswitch unit (Ref. 76-11-00, P. Block 501).
(5)Install rigging pin 98A76101003000 in pulley of autothrottle coupling unit.
(6)Remove safety clips (1) from turnbuckles (2).
(7)Gradually loosen barrels of turnbuckles (2) until locking bar 98A76103000000 can be installed and rigging pin 98A27901005000 can be inserted on cable tension regulator.

B. Removal (Ref. Fig. 401, 402)
(1)Remove and discard cotter pin, remove nut (1) and washer (2). Remove bolt (3) and disengage rod (4) from regulator control bellcrank. (Ref. Fig. 402)
NOTE : To avoid damage, temporarily support rod (4) on a fixed component in adjacent area.
(2)Remove and discard cotter pin, remove nut (5) and washer (6). Remove bolt (8) and disengage rod (7) from regulator.
NOTE : To avoid damage, temporarily support rod (7) on a fixed component in adjacent area.
(3)Remove and discard cotter pins, remove nuts (9), (14) and (19) and washers (10), (15), (20). Remove bolts (11), (16), (21), remove and retain spacers (13), (17), (22), (12), (18), (23). Remove fairlead (24).
(4)Remove four bolts (48), washers (51) remove and retain stirrups (50) and spacers (49). Remove casing (31) and (32).
NOTE : As casings are similar, only one removal is dealt with.
(5)Remove and discard cotter pins, remove nuts (25) and (28), remove washers (26) and (29), bolts (27) and (30), fairlead (33), remove and retain spacers (44), (45), (46) and (47).
(6)Loosen barrels of turnbuckles (2) until it is possible to free cable ends from their recesses in regulator quadrants.
(7)Remove and discard cotter pins, remove nut (34) on rear fitting and (36), (38) on front fitting. Remove washers (35), (37) and (39).
(8)Support cable tension regulator and remove bolts (41) and (42) from front fitting and (40) from rear fitting. Remove and retain adjusting washers (43) and remove regulator.

C. Preparation of Replacement Component (Ref. Fig. 403)
(1)Make certain that replacement components is clean and free from corrosion or cracks.
(2)Clean mounting area and check attach fittings for corrosion or cracks.
(3)Disassembly of cable tension regulator
(a)Remove and discard cotter pin, remove nut (1), remove washers (2) and (4), remove bellcrank (3), remove bolt (5) from regulator hub.
(b)Remove and discard cotter pins, remove four nuts (8) and nut (9). Remove four washers (7), (10), remove four bolts (6), remove bolt (11) and washer (12), remove flange (16) and shackle (13) with spacer (14).
(c)Remove regulator (17) from flange (15).
(4)Installation of the replacement regulator.



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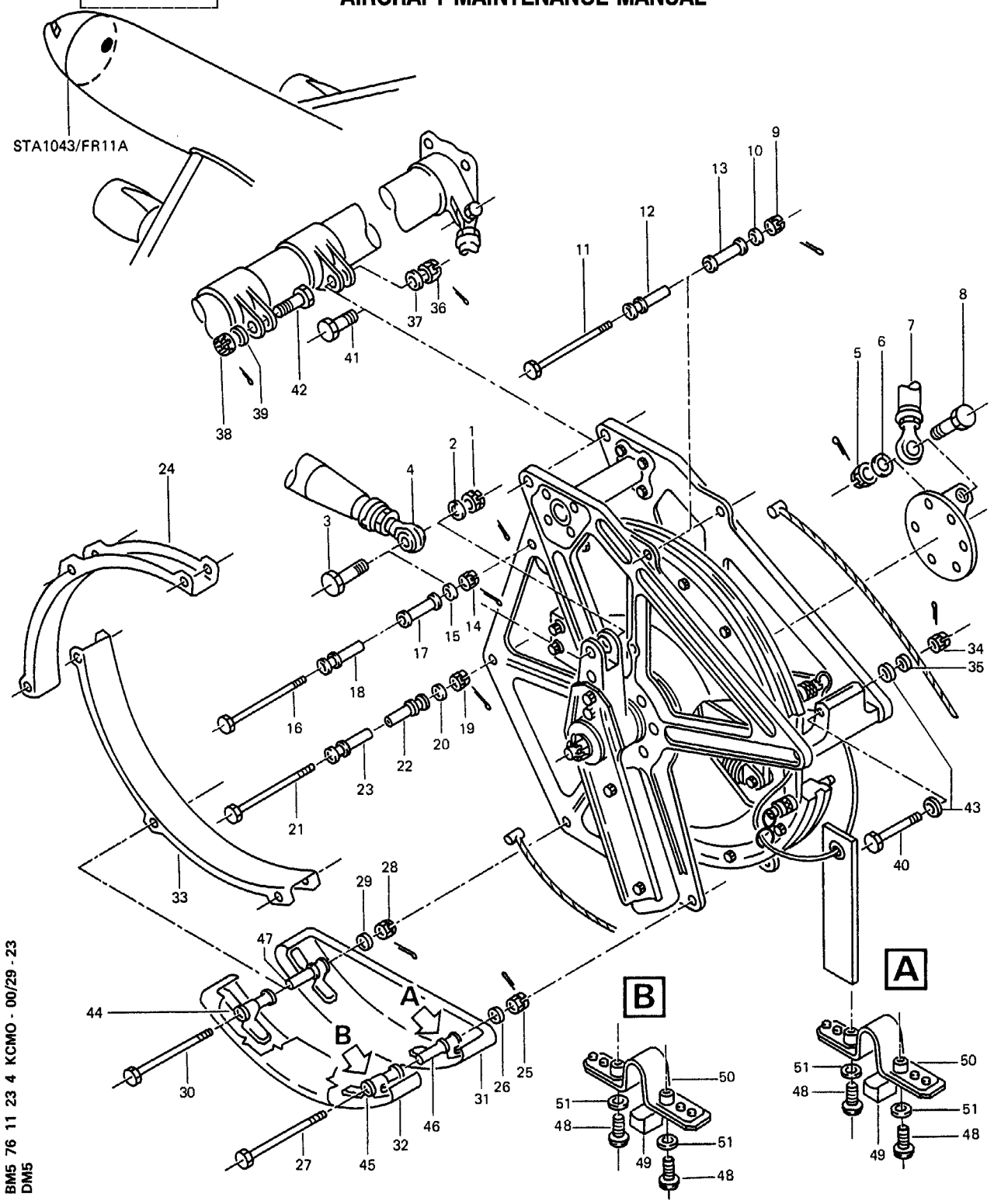
Cable Control in Fuselage
Figure 401



Cable Tension Regulator
Figure 402

WARNING : LOCKING BAR 98A76103000000 MUST BE IMPERATIVELY INSTALLED ON REPLACEMENT CABLE TENSION REGULATOR.

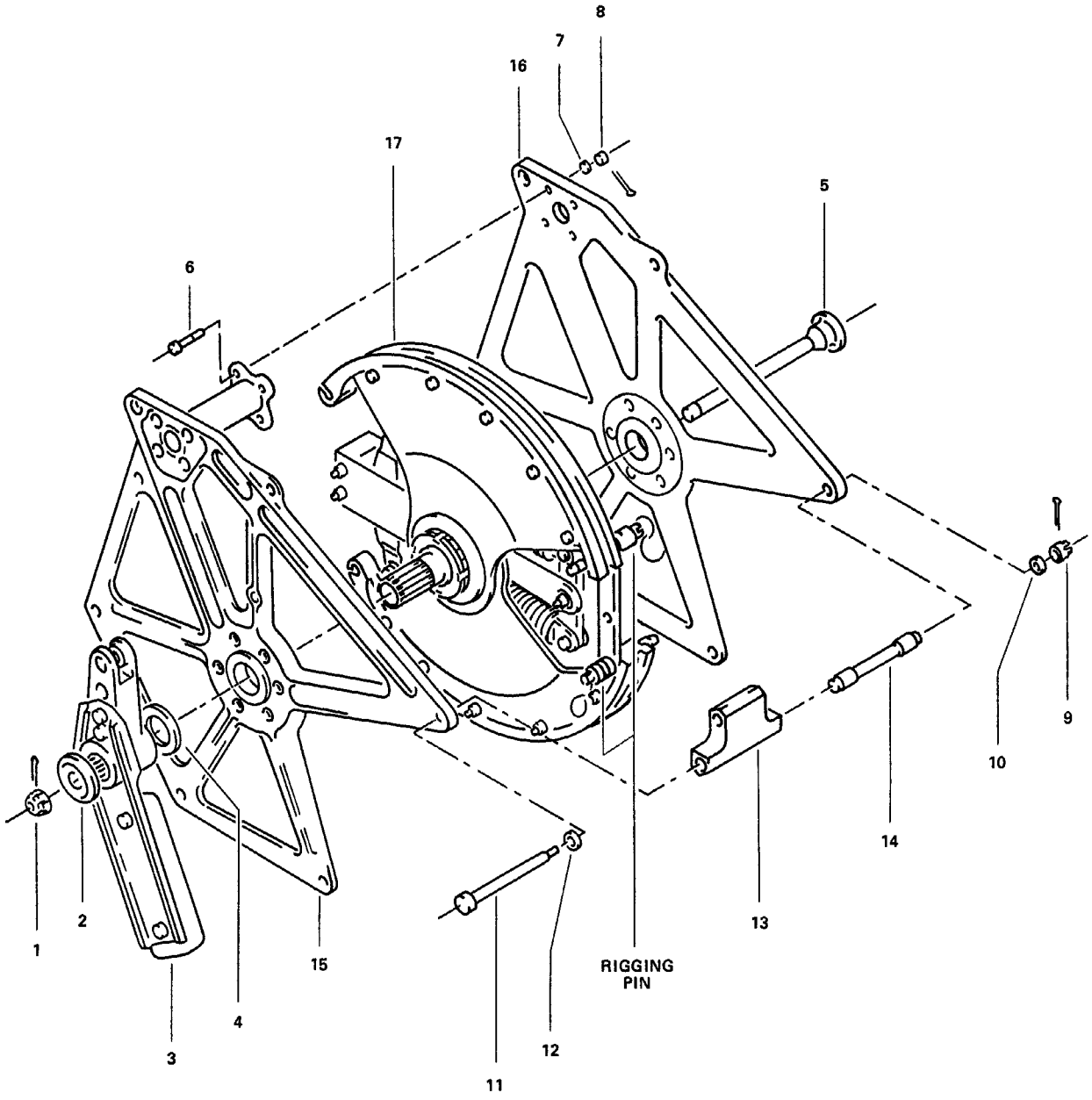
(a)Engage plain end of regulator hub into the bearing of flange (16). Engage bolt (5) into regulator hub (17).
(b)Position shackle (13) equipped with spacer (14) on flange (16).
(c)Center flange (15) on regulator hub (17). Engage the shoulder of spacer riveted to flange (15) in its hole in flange (16), install bolt (11) and washer (12) through shackle.
(d)Install four washers (7), (10) install four bolts (6). Tighten four nuts (8) and (9) and safety with new cotter pins.
(e)Engage adjusting washer (4) on regulator hub.
(f)Engage bellcrank (3) on splined section checking its position with respect to the regulator. Engage washer (2), tighten nut (1) and safety with new cotter pin.
(g)Bring regulator in position for installation. Support regulator, inserting pin 98A27901005000 in control bellcrank.

D. Installation (Ref. Fig. 401, 402)

(1)Place cable tension regulator in installation position and install bolts (41) and (42) on front fitting and bolt (40) with adjusting washers (43) on rear fitting.
(2)On front fitting, engage washers (37) and (39), tighten nuts (36) and (38) and safety with new cotter pins.
(3)On rear fitting, install washer (35), tighten nut (34), safety with new cotter pin.
(4)Engage end fitting of rod (7) in regulator attachment yoke, install bolt (8), washer (6). Tighten nut (5), safety with new cotter pin.
(5)Engage each cable end in its respective recess in cable quadrants.
WARNING : MAKE CERTAIN THAT CABLES ARE NOT CROSSED.
(6)Install spacers (44), (45), (46) and (47).
(7)Install casing (31) and (32), install stirrups (50) and spacers (49). Install four washers (51) and screws (48) with Material No. 08-002. Tighten screws (48).
NOTE : As casings are similar, only one installation is dealt with.
(8)Install fearfead (33), bolts (30) and (27). Install washers (26) and (29), tighten nuts (25) and (28) and safety with new cotter pins.
(9)Install spacers (13), (17), (22), (12), (18) and (23). Install fairlead (24). Install bolts (11), (16) and (21), washers (10), (15) and (20), nuts (9), (14) and (19) and safety with new cotter pins.
(10)Engage end fitting of rod (4) in yoke of cable tension regulator input bellcrank. Install bolt (3), washer (2) and tighten nut (1). Safety with a new cotter pin.
(11)Carry out all necessary adjustments and test (Ref. 76-11-00, P. Block 501).

E. Close-Up

(1)Safety turnbuckles (2) with new safety pins (1).
(2)Remove rigging pins 99A76101003000, 98A76101003000, 98A27901005000 and 98A76103000000.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



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Cable Tension Regulator
Figure 403

(4)Install panel 131SW (132SW) in FWD cargo compartment.
(5)Remove warning notice.
(6)Remove safety clips and tags and close circuit breakers 306CJ1, 308CJ1, 305CJ1, 1JH, 2JH, 8JH, 1KG, 1KM and 2KM.
(7)Remove access platforms.
(8)Make certain that throttle control levers are in idle position.

THROTTLE CABLE TENSION REGULATOR - INSPECTION/CHECK

1. Check of the Throttle Control Cables Tension

A. General

The purpose of this procedure is to check tension of throttle control cables in the fuselage.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Warning Notice
C.	Tensiometer
Referenced Procedures	
- 76-11-00, P. Block 501	Throttle Controls
- 76-11-23, P. Block 401	LH and RH Cable Tension Regulator

C. Procedure

(1)Job Set-Up

(a)Position access platform at FWD cargo compartment door. Open FWD cargo compartment door then doors 131SW (132SW).

(b)In flight compartment

- Install a warning notice prohibiting operation of throttle control lever and flight controls.

(2)Check that pointer on cable tension regulators (zone 120) compensation scale is within limits (according to ambient temperature) (Ref. Fig. 601, 602).
If adjustment is necessary (Ref. 76-11-00, P. Block 501).

(3)Using a tensiometer, check that cable tension is between 49.4 and 74.2 lbf (22 and 33 daN). If cable tension is not within the acceptable limits, replace the throttle cable tension regulator (Ref. 76-11-23, P. Block 401).

(4)Close-Up

(a)Install panel 131SW (132SW) in FWD cargo compartment.

(b)Remove warning notice.

(c)Remove access platform.

2. Inspection of the Tension Regulator Crank

CAUTION : DISPLAY A WARNING NOTICE ON THE LEVERS AND ON ENGINE START PANEL 429VU, NOT TO MOVE THE THROTTLE LEVERS AND START ENGINES. RIGGING PINS WILL BE FITTED TO MICROSWITCH UNIT AND AUTOTHROTTLE COUPLING UNIT.

NOTE : Removal/Installation procedures are identical for both LH and RH cable tension regulators.

A. Equipment and Materials

ITEM	DESIGNATION
A. 99A76101003000	Pin-Rigging, Throttle Control Microswitch Unit

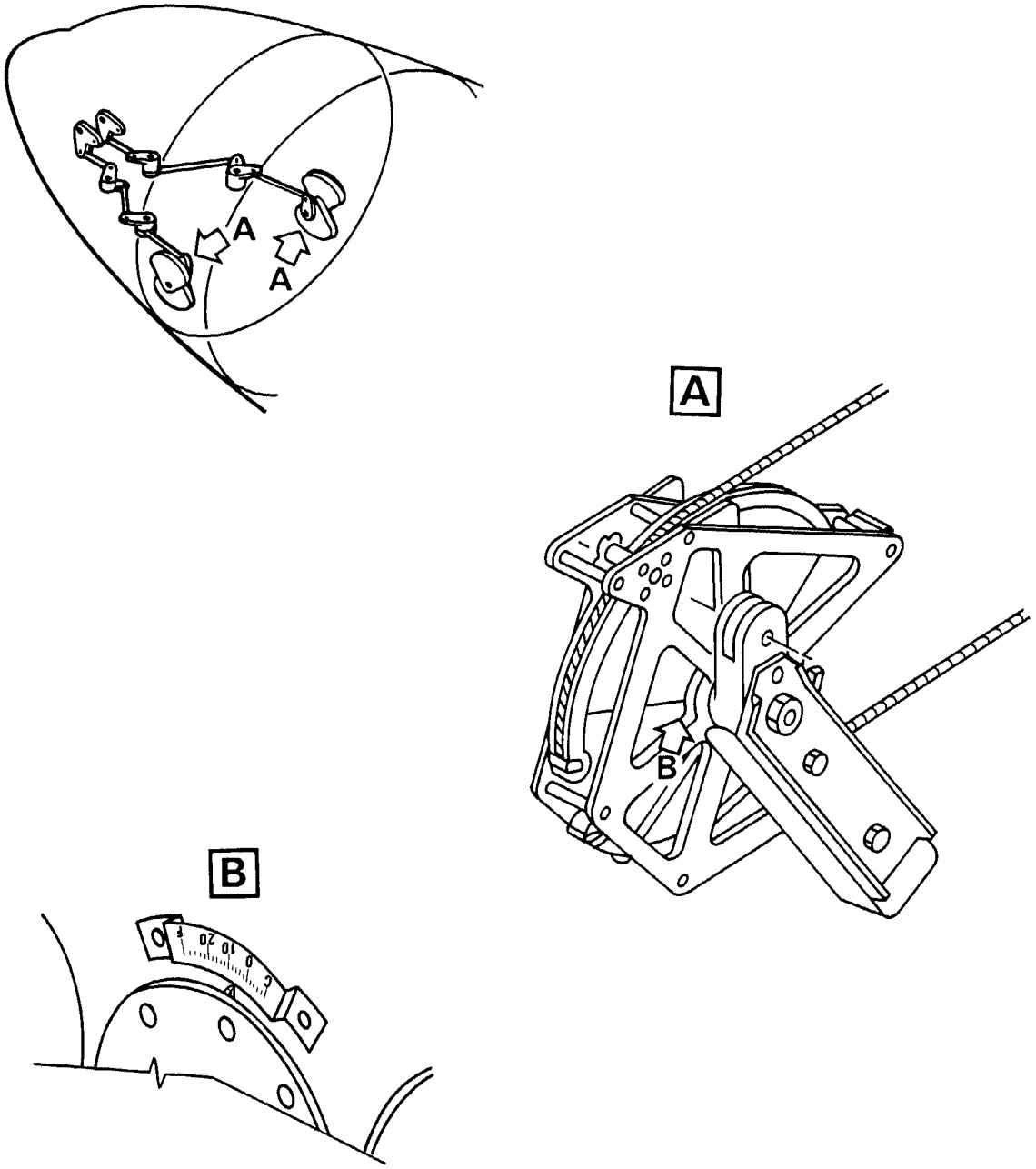
ITEM	DESIGNATION
B. 98A76101003000	Pin-Rigging, Autothrottle Coupling Unit
C. 98A27901005000	Pin-Rigging, Cable Tension Regulator
D.	Warning Notices
Referenced Procedure	
- 22-33-16, P. Block 401	Throttle Position Detectors
- 76-11-00, P. Block 501	Throttle Controls
- 76-11-22, P. Block 401	Throttle Control Microswitch Unit

B. Job Set-Up
(1)In flight compartment, make certain that the throttle control levers are in idle position.
(2)Display a warning notice on panel 429VU prohibiting starting of the engines.
(3)Display a warning notice on panel 9VU to prohibit any operation.
(4)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/TCC/SYS1/28VDC	306/CJ1	102/H 8
21VU	AFS/TCC/SYS1/115VAC	308/CJ1	102/H 9
21VU	AFS/TCC/SENSORS	305/CJ1	102/H10
133VU	ENGINES/ENG2/REVERSE/CTL	2KM	331/V74
133VU	ENGINES/ENG1/REVERSE/CTL	1KM	332/U69
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1&2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG1&2/START/CTL & WARN	1KG	335/R68

(5)Get access to avionics compartment
C. Inspection (Ref. Fig. 603)
(1)Install rigging pin 98A27901005000 in the regulator input crank.
(2)Put a shim on the forward face of the crank in front of the rigging pin.
(3)Check that the dimension "A" between the shim and the pin in position is approximately 7 mm.
(4)If the measured dimension is approximately 12 mm, the installed crank is not correct. Replace this crank by a new crank.
(5)Remove rigging pin 98A27901005000.

D. Replacement of Tension Regulator Crank (Ref. Fig. 604, 605)
(1)Open door 131AZ (132AZ) to get access to forward cargo compartment.
(2)In forward cargo compartment, at STA2210, remove panel 131SW (132SW) for access to autothrottle coupling unit.
(3)Install rigging pin 98A76101003000 in pulley of autothrottle coupling unit.
(4)In avionics compartment, install rigging pin 99A76101003000 in microswitch unit.
(5)Remove tension regulator crank.
(a)Remove and discard cotter pin, remove nut (4) and washer (3).



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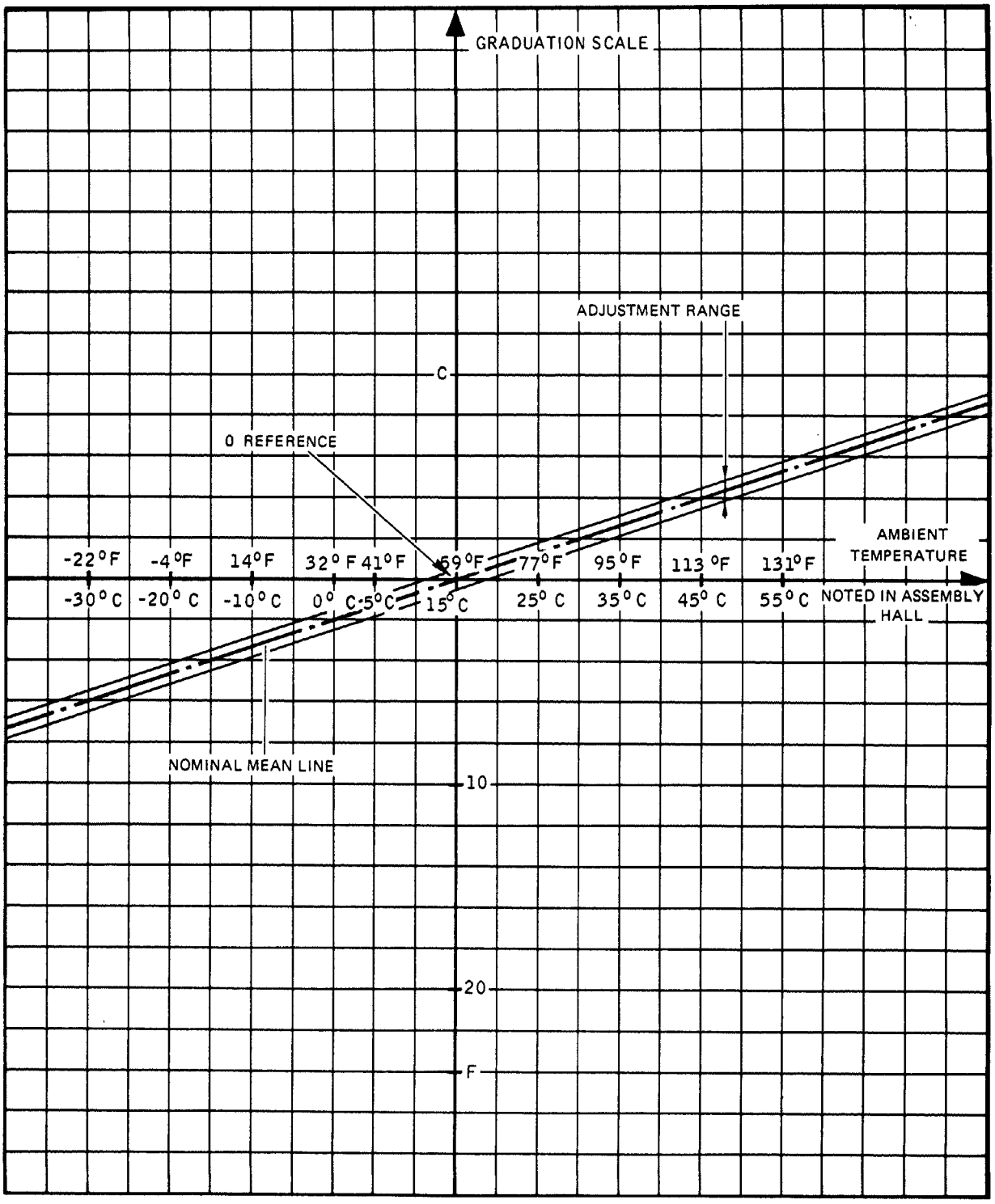
Cable Tension Regulators Compensation Scale
Figure 601



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Fuselage Section - Cable Tension Adjustment Graph
Figure 602

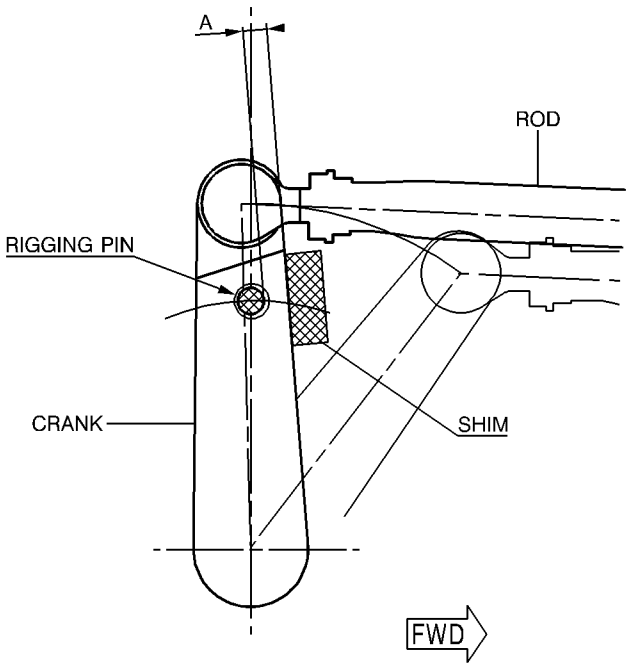
(b)Remove bolt (1) and disengage rod (2) from tension regulator crank.
NOTE : To avoid damage, temporarily support rod (2) on a suitable component in adjacent area.
(c)Remove and discard cotter pin, remove nut (9).
(d)Remove washer (8), crank (7) and keep pin (5) and washer (6) in tension regulator hub.
(e)Remove tension regulator crank (7) from cable tension regulator assembly.
(6)Remove the mounting plate, including the balance weight, from the removed crank.
(a)Remove and discard cotter pins, remove the two nuts (14) and washers (13).
(b)Remove the two bolts (10), mounting plate (11) and shim (12) from crank (7). Discard the crank.
(7)Install the mounting plate, including the balance weight, on a new crank.
(a)Install shim (12) and mounting plate (11) on crank (7) with two bolts (10).
(b)Install the two washers (13) and nuts (14). Tighten the nuts. Safety with two new cotter pins.
(8)Install the crank on cable tension regulator assembly.
(a)Check that pin (5) is engaged in regulator hub.
(b)Check that adjusting washer (6) is installed on regulator hub.
(c)Put crank in position on grooved shaft.
NOTE : The foolproofing device to install the crank in correct position, consists of a missing tooth in crank boring and a larger tooth on grooved shaft.
(d)Install washer (8). TORQUE nut (9) to between 80 and 88.5 lbf.in. (0.9 and 1 m.daN). Safety with a new cotter pin.
(e)Adjust the length of adjustable rod (Ref. Fig. 604) so that it is possible to connect the rod (2) to crank with rigging pin in microswitch unit sliding freely.
(f)Engage end of rod (2) in yoke of crank. Install bolt (1) and washer (3). Tighten nut (4) and safety with a new cotter pin.

E. Test
(1)Install rigging pin 98A27901005000 in cable tension regulator.
(2)Make certain that rigging pins slide freely.
(3)If necessary, adjust again length of adjustable rod and adjust cable between cable tension regulator and autothrottle coupling unit (Ref. 76-11-00, P. Block 501).
(4)Remove the rigging pins at microswitch unit, cable tension regulator assembly and autothrottle coupling unit.
(5)Check adjustment of the microswitch unit (Ref. 76-11-22, P. Block 401).
(6)Check adjustment of the throttle position detector as per installation procedure (Ref. 22-33-16, P. Block 401).
(7)Perform several complete cycles of throttle control lever and check that there is no friction point or binding in complete throttle and thrust reverser control lever travel.

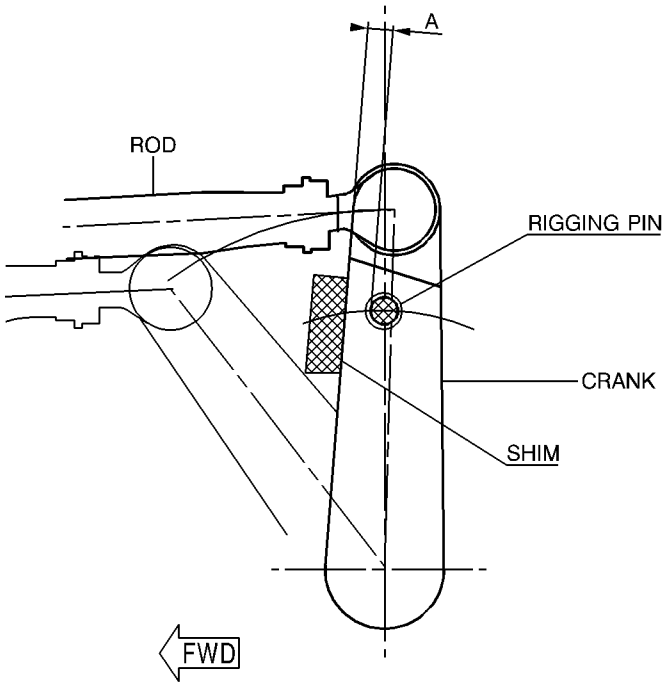
F. Close-Up
(1)Install panel 131SW (132SW)

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove safety clips and tags and close circuit breakers 306CJ1, 308CJ1, 305CJ1, 1JH, 2JH, 8JH, 1KG, 1KM and 2KM.

LH TENSION REGULATOR CRANK (ENG 1)



RH TENSION REGULATOR CRANK (ENG 2)



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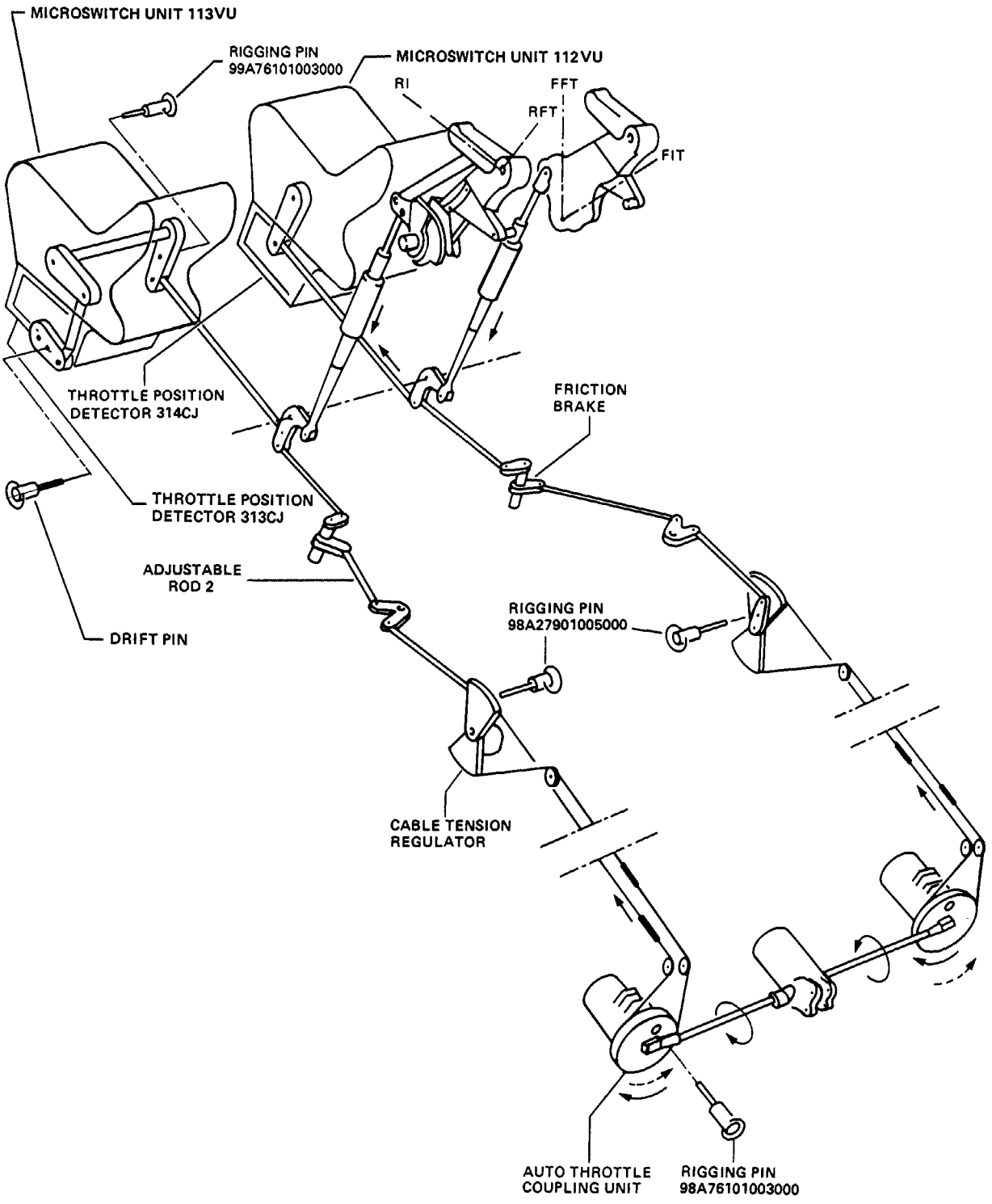
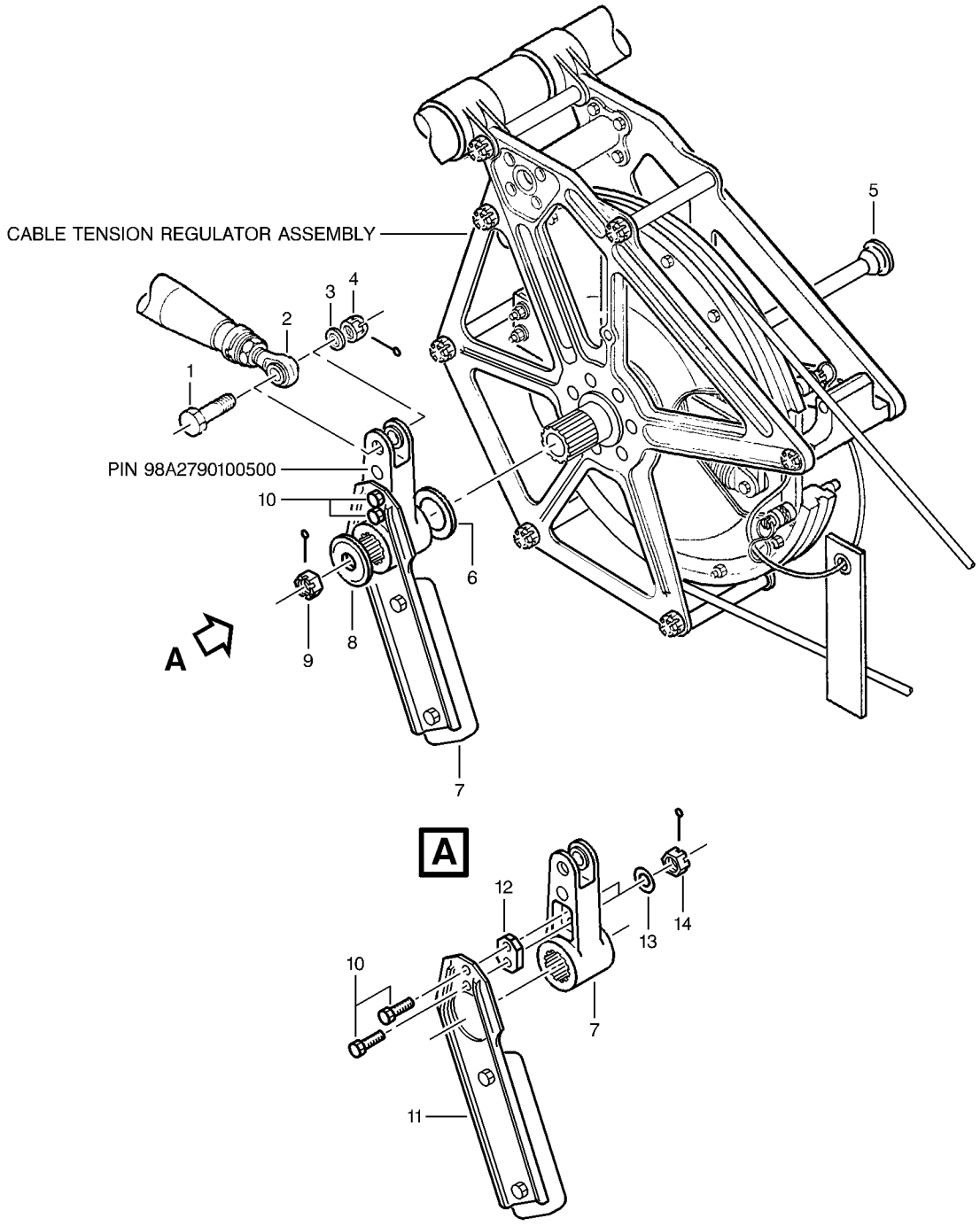
Tension Regulator Crank - Inspection
Figure 603



BM5 76 11 23 6 KLM0 00

Rigging Pin - Installation
Figure 604



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Tension Regulator Crank - Replacement
Figure 605

HP FUEL SHUT-OFF VALVE CONTROL - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 002)
(Ref. Fig. 001)

The HP fuel shut-off valve control is electric when the high pressure fuel shut-off valve control lever, located on flight compartment center pedestal panel 9VU, is placed in ON position, an electric signal is sent to the Fuel Metering Unit (FMU) that has an integral solenoid actuated fuel start/stop function.

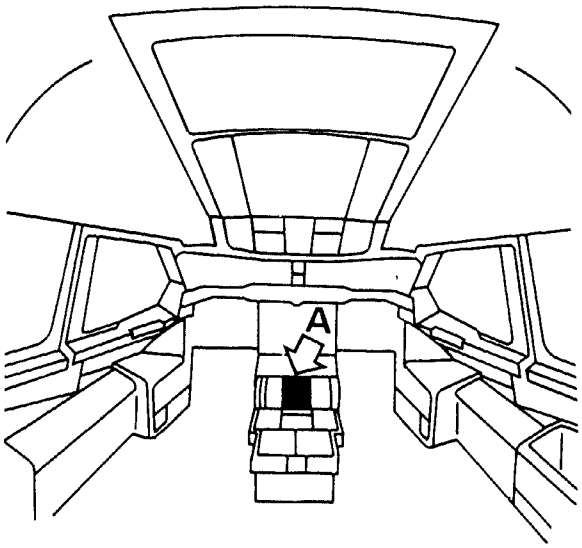
When the fuel HP control is placed in ON position, the associated electrical contacts are used for the following systems :

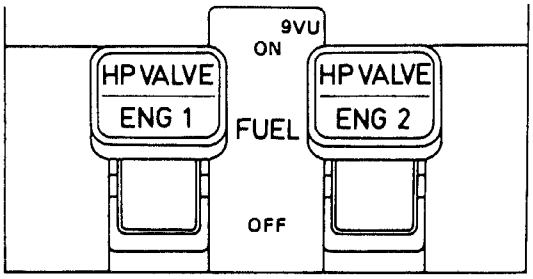
- ignition system : if ignition has been selected on the engine START panel, selection of fuel HP ON will permit to energize the selected ignitor(s).
- FADEC reset : if HP fuel shut-off valve lever is selected to OFF position, two integrated microswitches provide a reset signal to each FADEC channel.
- FADEC ground test : HP fuel shut-off valve lever in OFF position, is one of the conditions required to select the FADEC ground test.

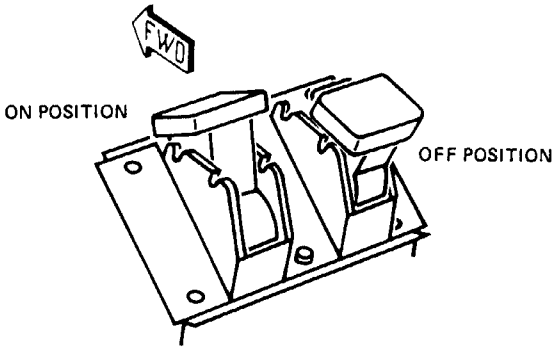
2. Component Location
(Ref. Fig. 003)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
7KC	LEVER - HP FUEL SHUT-OFF VALVE CONTROL	9VU	211		76-12-11
8KC	LEVER - HP FUEL SHUT-OFF VALVE CONTROL	9VU	212		76-12-11
	ACTUATOR - FUEL METERING UNIT		452	452AR	73-23-00
			462	462AR	73-23-00

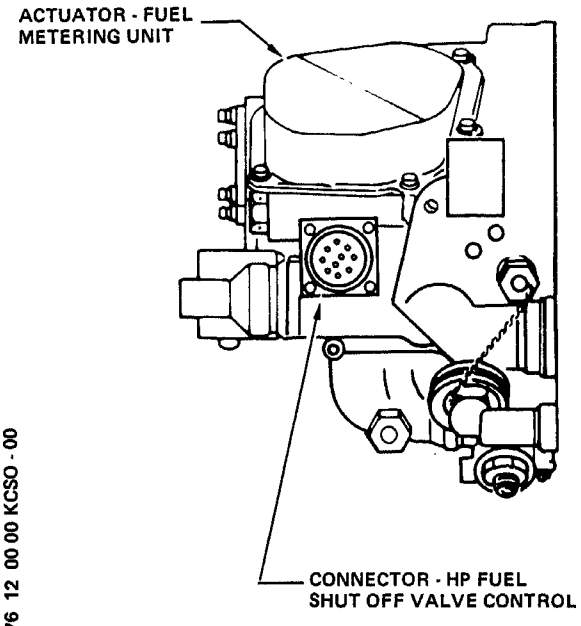
A







HP FUEL SHUT OFF VALVE
CONTROL LEVERS



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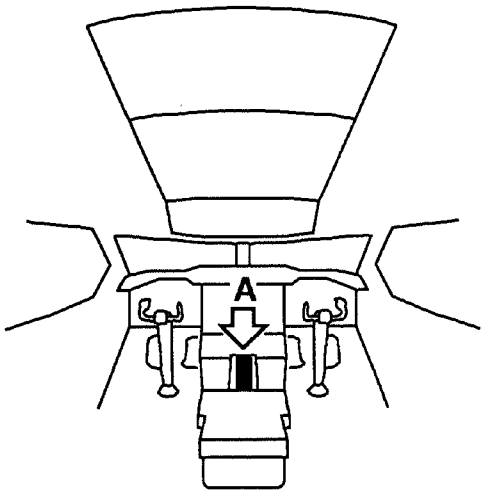
HP Fuel Shutoff Valve
Figure 001



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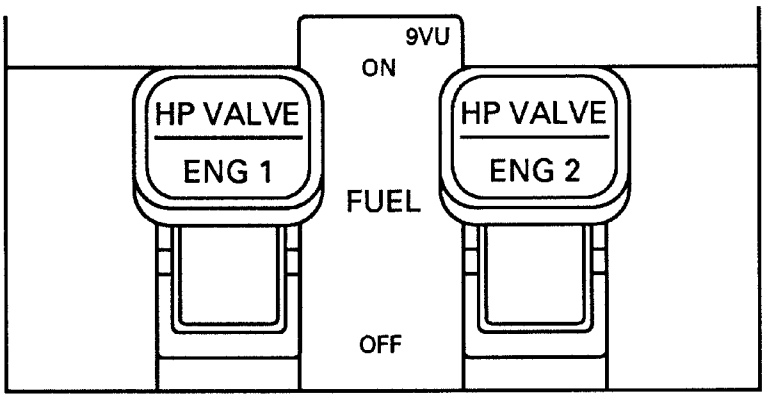

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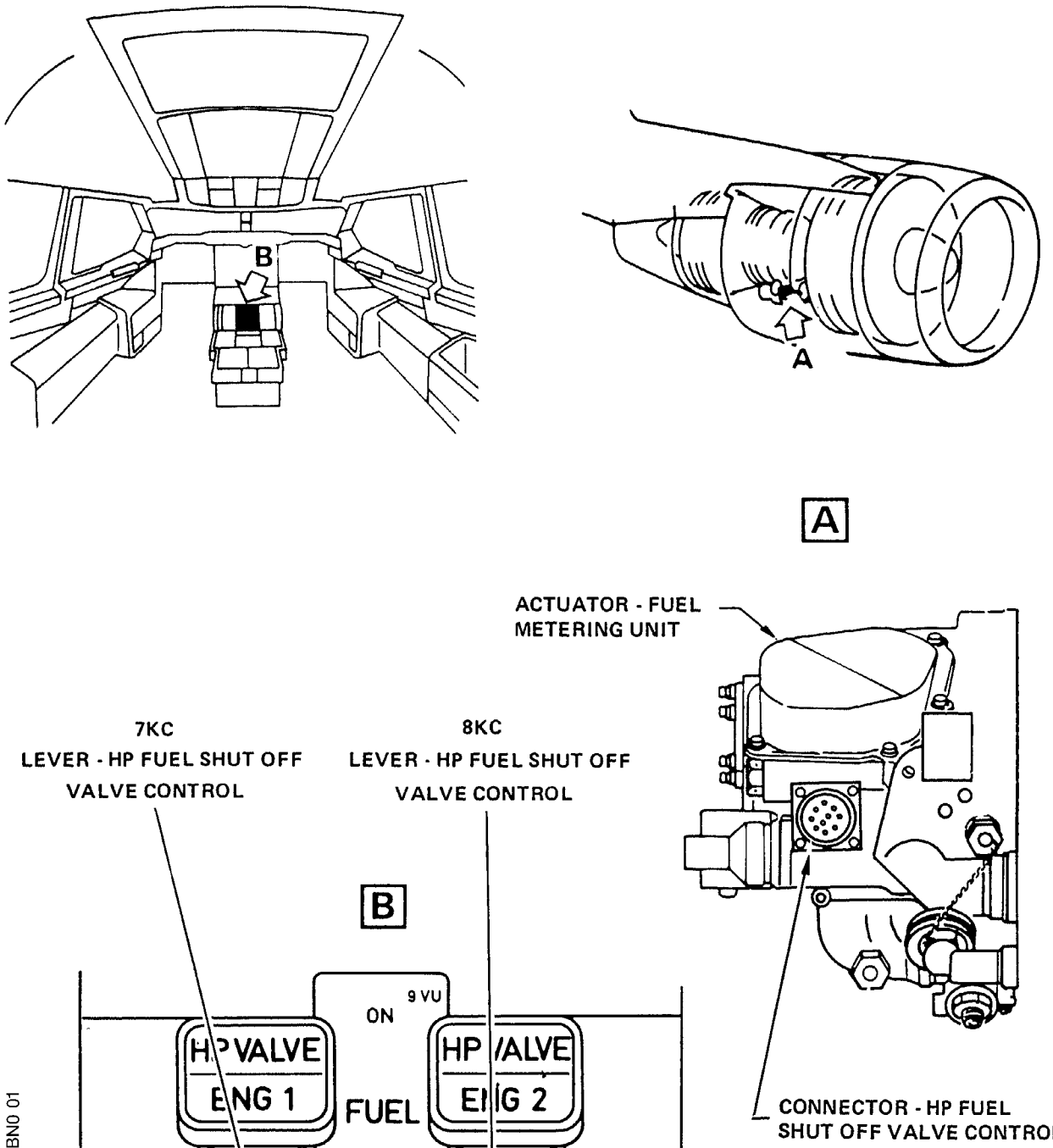
HP Fuel Shut-Off Valve Control Levers
Figure 002



HP Fuel Shut-Off Valve Control - Component Location
Figure 003

3. Electrical Operation (Ref. Fig. 005)
(Ref. Fig. 004)
The solenoid controlling the HP fuel shut-off valve is controlled with 28VDC from busbar 307PP through circuit breaker 3KC (4KC), which is self-monitored on the ground (circuit WY) and located on panel 133VU.

A. Setting of the HP fuel shut-off valve control lever 7KC (8KC) to ON result in.
- de-energization of time delay relay 37KC (38KC) and relays 13KC (12KC), 19KC (18KC), 35KC (34KC).
- energization of RUN SOLENOID.

When the HP fuel shut-off valve is open :
- energization of time delay relay 37KC (36KC) and relay 31KC (30KC).

After four seconds (relay 37KC (36KC) closes) :
- de-energization of RUN SOLENOID.

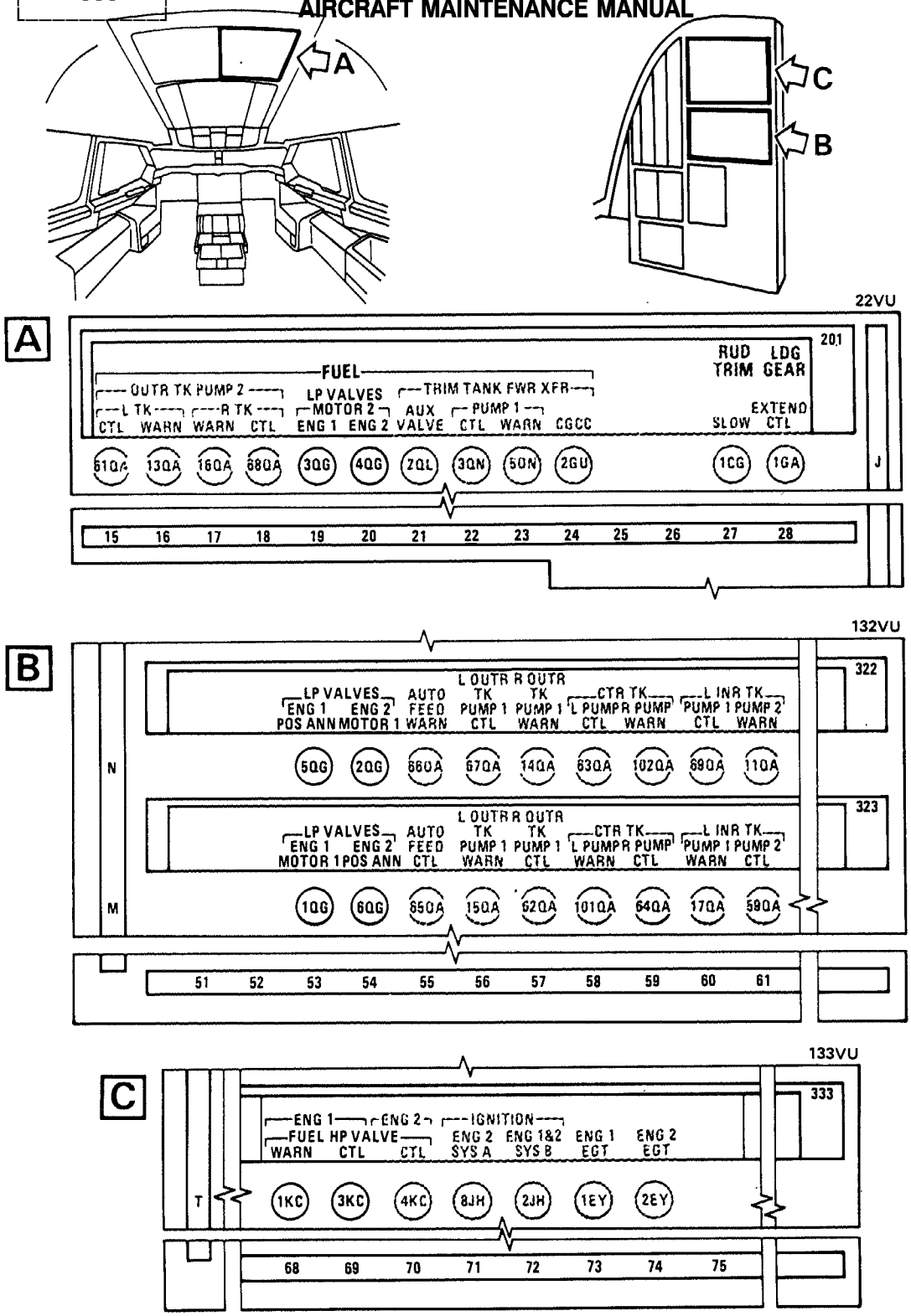
B. Setting of the HP fuel shut-off valve control lever 7KC (8KC) to OFF result in :
- de-energization of time delay relay 37KC (36KC).
- energization of shut-off solenoid.

When the HP fuel shut-off valve is closed :
- energization of time delay relay 37KC (36KC) and relay 31KC (30KC).

After four seconds (37KC (36KC) closes) :
- energization of relays 13KC (12KC), 35KC (34KC) and 19KC (18KC).
- de-energization of shut-off solenoid.

C. If setting of the HP fuel shut-off valve control lever 7KC (8KC) is disagreed to valve position (open or closed). After three seconds, the time delay relay 31KC (30KC) is de-energized and the red HP valve ENG 1 (ENG 2) warning light comes on.

D. Engine Fire
If the HP fuel shut-off valve is open :
- relay 19KC(18KC) is de-energized. In case of engine fire relay 17KC(12KC) is energized and triggers the red HP VALVE/ENG1(ENG2) warning light.


A
C
B
22VU
201
FUEL
OUTR TK PUMP 2
L TK
R TK
LP VALVES
MOTOR 2
TRIM TANK FWR XFR
AUX
PUMP 1
RUD LDG
TRIM GEAR
EXTEND
CTL WARN WARN CTL ENG 1 ENG 2 VALVE CTL WARN CGCC SLOW CTL
61QA 13QA 16QA 68QA 3QG 4QG 2QL 3QN 5QN 2GU 1CG 1GA J
15 16 17 18 19 20 21 22 23 24 25 26 27 28
132VU
322
L OUTR R OUTR
LP VALVES
AUTO
TK TK
CTR TK
L INR TK
ENG 1 ENG 2 FEED PUMP 1 PUMP 1 L PUMP R PUMP PUMP 1 PUMP 2
POS ANN MOTOR 1 WARN CTL WARN CTL WARN CTL WARN CTL WARN
5QG 2QG 66QA 67QA 14QA 63QA 102QA 69QA 11QA
323
MOTOR 1 POS ANN CTL WARN CTL WARN CTL WARN CTL
1QG 6QG 65QA 15QA 62QA 101QA 64QA 17QA 59QA
N
M
51 52 53 54 55 56 57 58 59 60 61
133VU
333
ENG 1
ENG 2
IGNITION
FUEL HP VALVE
WARN CTL CTL
ENG 2 SYS A
ENG 1&2 SYS B
ENG 1 EGT
ENG 2 EGT
1KC 3KC 4KC 8JH 2JH 1EY 2EY
T
68 69 70 71 72 73 74 75

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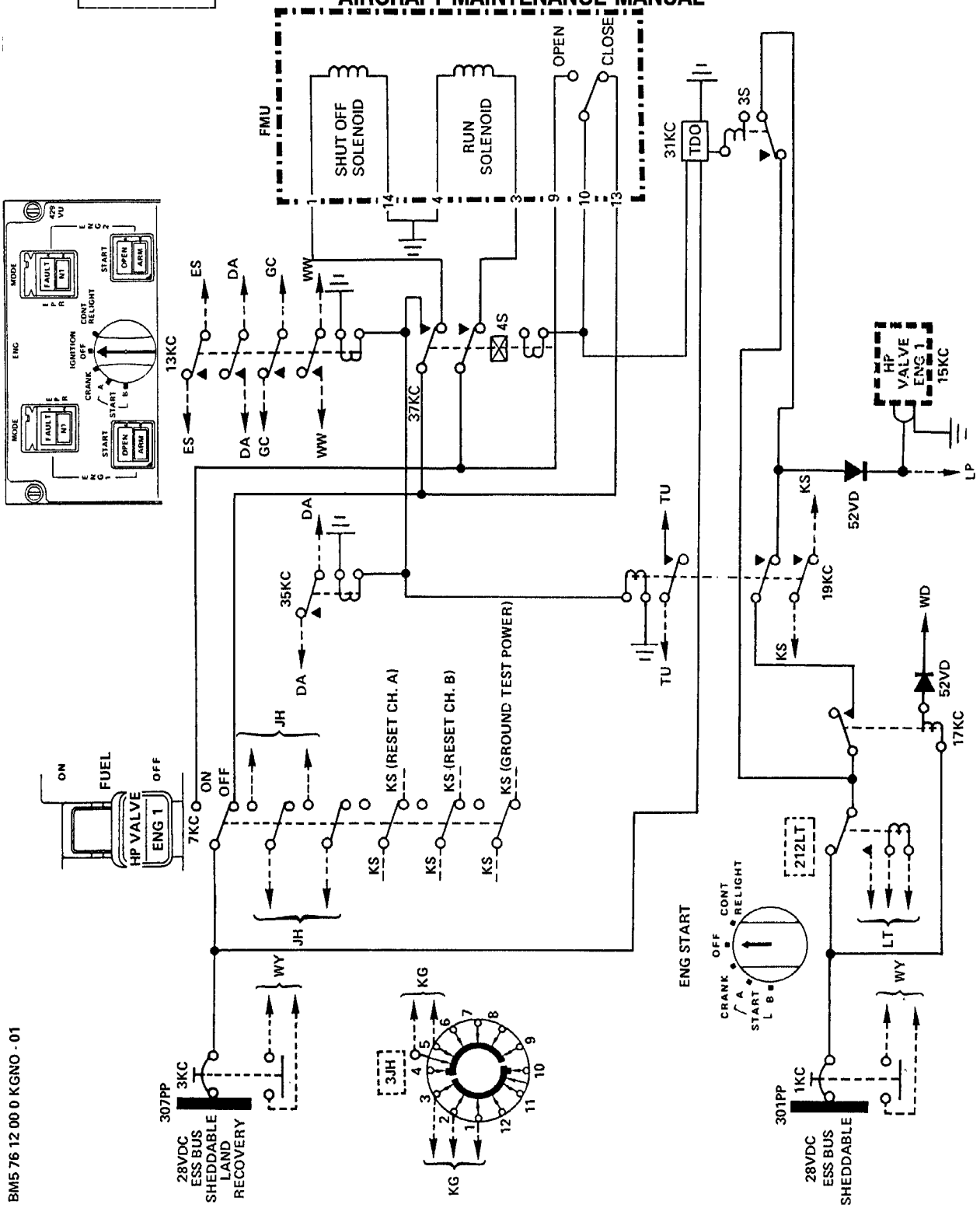
Component Location - Circuit Breakers
Figure 004



Electrical Circuit
Figure 005

HP FUEL SHUT-OFF VALVE CONTROL LEVERS - REMOVAL/INSTALLATION

WARNING : BEFORE ATTEMPTING REMOVAL/INSTALLATION PROCEDURES FOR HP FUEL SHUT-OFF VALVE CONTROL LEVERS, MAKE CERTAIN HP FUEL SHUT-OFF VALVES ARE CLOSED AND CIRCUIT BREAKERS ASSOCIATED WITH CENTER CONTROL PEDESTAL 9VU ARE OPENED.

WARNING : AS A SAFETY PRECAUTION, DISPLAY WARNING NOTICES ON CIRCUIT BREAKER PANEL 133VU.

NOTE : Removal/Installation procedures are identical for both HP fuel shut-off valve control levers.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notices
C.	Chronometer
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 74-00-00, P. Block 501	Ignition

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/ENG1 & 2/IGNITION/SYS B	2JH	333/T72
133VU	ENGINES/ENG1/IGNITION/SYS A	1JH	334/S72
133VU	ENGINES/ENG2/IGNITION/SYS A	8JH	333/T71
133VU	ENGINES/ENG1/FUEL HP VALVE/WARN	1KC	333/T68
133VU	ENGINES/ENG1/FUEL HP VALVE/CTL	3KC	333/T69
133VU	ENGINES/ENG2/FUEL HP VALVE/CTL	4KC	333/T70
133VU	ENGINES/ENG2/FUEL/HP VALVE/WARN	2KC	335/R73

(2)Display warning notices prohibiting use of circuit breakers on panels 133VU.

B. Removal

(1)Removal of HP fuel shut-off valve control lever.
(Ref. Fig. 401, 402)

(a)Remove screws (1). Remove ON-FUEL-OFF center plate (3) and blanking plates (2) and/or (4).

(b)Place HP fuel shut-off valve control lever to be removed in ON position, remove screws (5) and blanking cover (6).

(c)Remove nut (8) grounding lead (7) and disconnect supply cable (9).

(d)Remove screws (12) and (13) and disengage control lever assembly from housing.

(e)Disconnect electrical wiring from switch (10).

(2)Disassembly of HP fuel shut-off valve control lever (Ref. Fig. 403)
(a)Drive out cotter pins (26) and remove pins (27) and washers (28) to separate HP fuel shut-off valve control unit from casing (29).
(b)Remove switch (10) from casing (29).
(c)Remove screws (30) and plate (31).
(d)Remove screws (18) and integrally lighted identification plate (17).
(e)Drive out piano wire (23) and remove knob (21) and receptacle (20).
(f)Remove spindle (25), spring (24) and swinging yoke (22).

C. Installation
(1)Assembly of HP fuel shut-off valve control (Ref. Fig. 403)
NOTE : Both HP fuel shut-off valve controls are identical, only one assembly is covered.
(a)Install three-pole toggle switch (10) on casing (29).
(b)Install inserts (32) on knob (21).
(c)Install integrally lighted identification plate (17) equipped of receptacle connector (20) and lamps on knob (21) with screws (18).
(d)Engage spring (24) and spindle (25) on swinging yoke (22). Then assemble equipped swinging yoke on knob (21) with pin (23).
(2)Installation of HP fuel shut-of valve control lever (Ref. Fig. 402).
(a)Place HP fuel shut-off valve control (16) in position on center pedestal.
(b)Connect electrical wiring to switch (10). Check wires for correct condition and security of attachment.
(c)Install tubular support (11) on casing (29) with screws (13) and washers (14). Tighten screws.
(d)Install HP fuel shut-off valve control lever on center pedestal with screws (12) and washers (15). Tighten screws.
(e)Install grounding lead (7) and nut (8), connect supply cable (9).
(f)Place lever in ON position, install inserts (19) on swinging yoke. Then install blanking cover (6) with screws (5) and washers. Tighten screws.
(g)Install integrally lighted identification plate (3) equipped with lamps and receptacle connector, and secure with screws (1). Tighten screws.
(h)Install blanking plate (2) and/or (4) and secure with screws (1). Tighten screws.

D.Test
(1)Job set-up
(a)Remove warning notices prohibiting use of circuit breakers on panels 133VU.
(b)Remove safety clips and tags and close circuit breakers 1KC, 2KC, 3KC, 4KC, 1JH, 2JH and 8JH.
(c)On panel 132VU, make certain that circuit breakers 1LP, 2LP, 149LP and 153LP are closed.
(d)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(e)Make certain that electronics racks ventilation is correct.
(2)Procedure

ACTION	RESULT
1. Overhead Panel On panel 436VU	

ACTION	RESULT
MANUAL TEST	
- place **ANN LT** switch in **TEST** position	All annunciator lights come on on the various panels as well as **HP VALVE/ENG1 (HP VALVE/ENG2)** warning light.
- place **ANN LT** switch in **BRT** position	All annunciator lights go off if no fault.
AUTOMATIC TEST	
- with **ANN LT** switch in **BRT** position, press **AUTO TEST** pushbutton switch	The automatic light test is initiated. The pushbutton switch unlatches automatically upon completion of the test or if pressed again to interrupt the test.

NOTE 1 : The annunciator lights not checked automatically remain on.

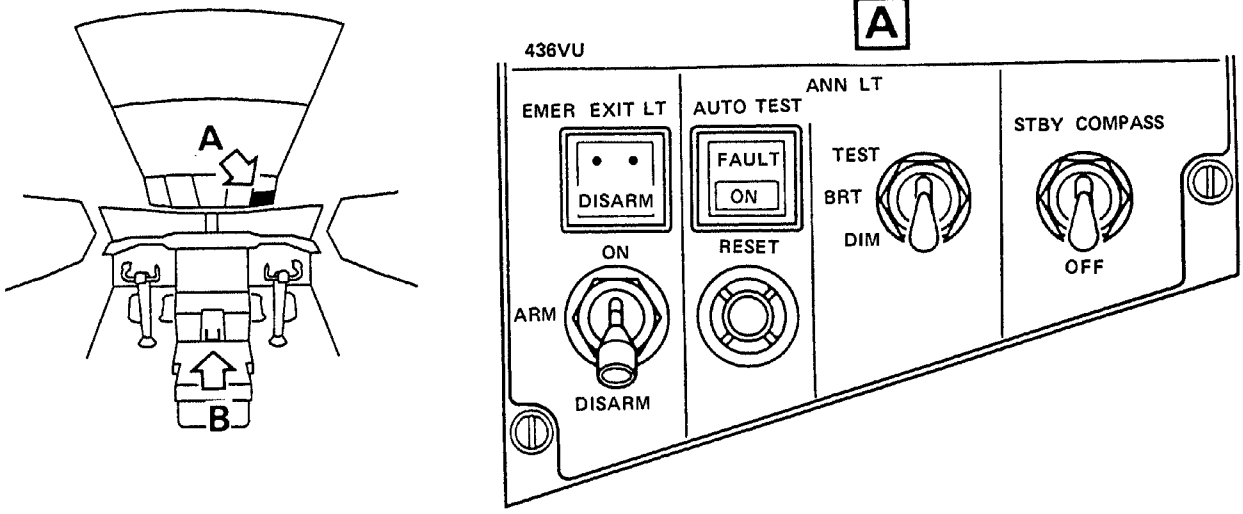
NOTE 2 : The digital displays show eight.

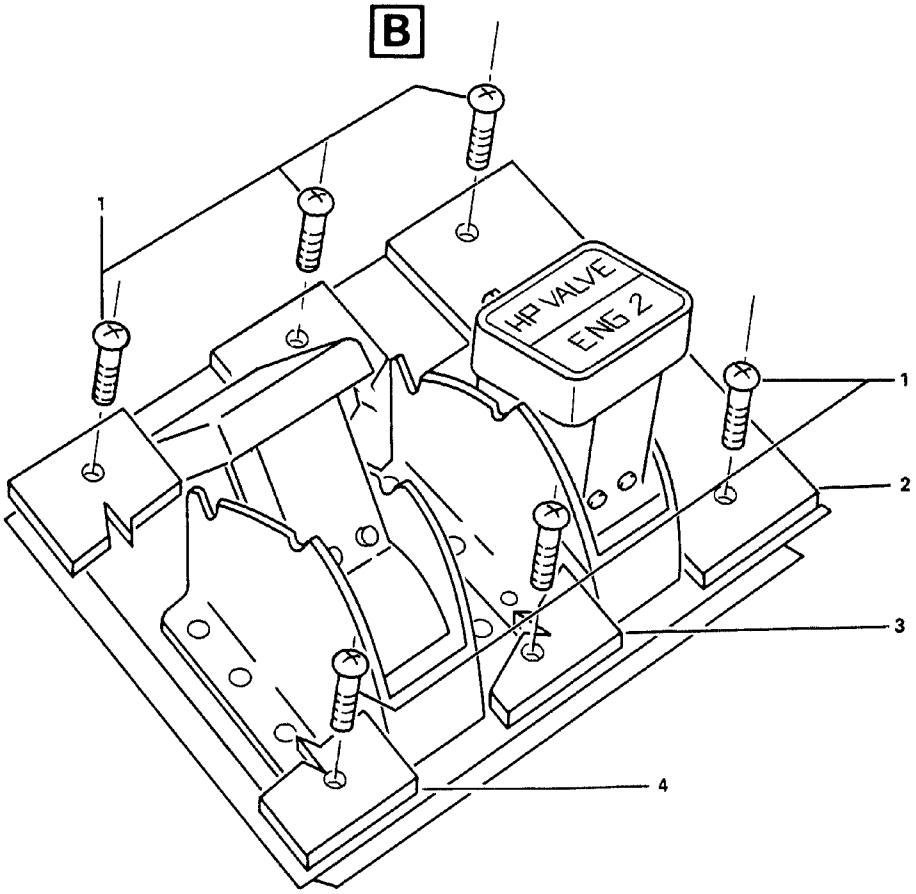
NOTE 3 : If a faulty light is detected during the automatic light test, press **RESET** pushbutton switch to continue the test.

At the end of the automatic light test, **ON** legend of **AUTO TEST** pushbutton switch goes off.

(3)Perform wet motoring (Ref. 71-00-00, P. Block 501 - Test No. 2).
(4)Perform test of ignition system (Ref. 74-00-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)De-energize the aircraft electrical network.





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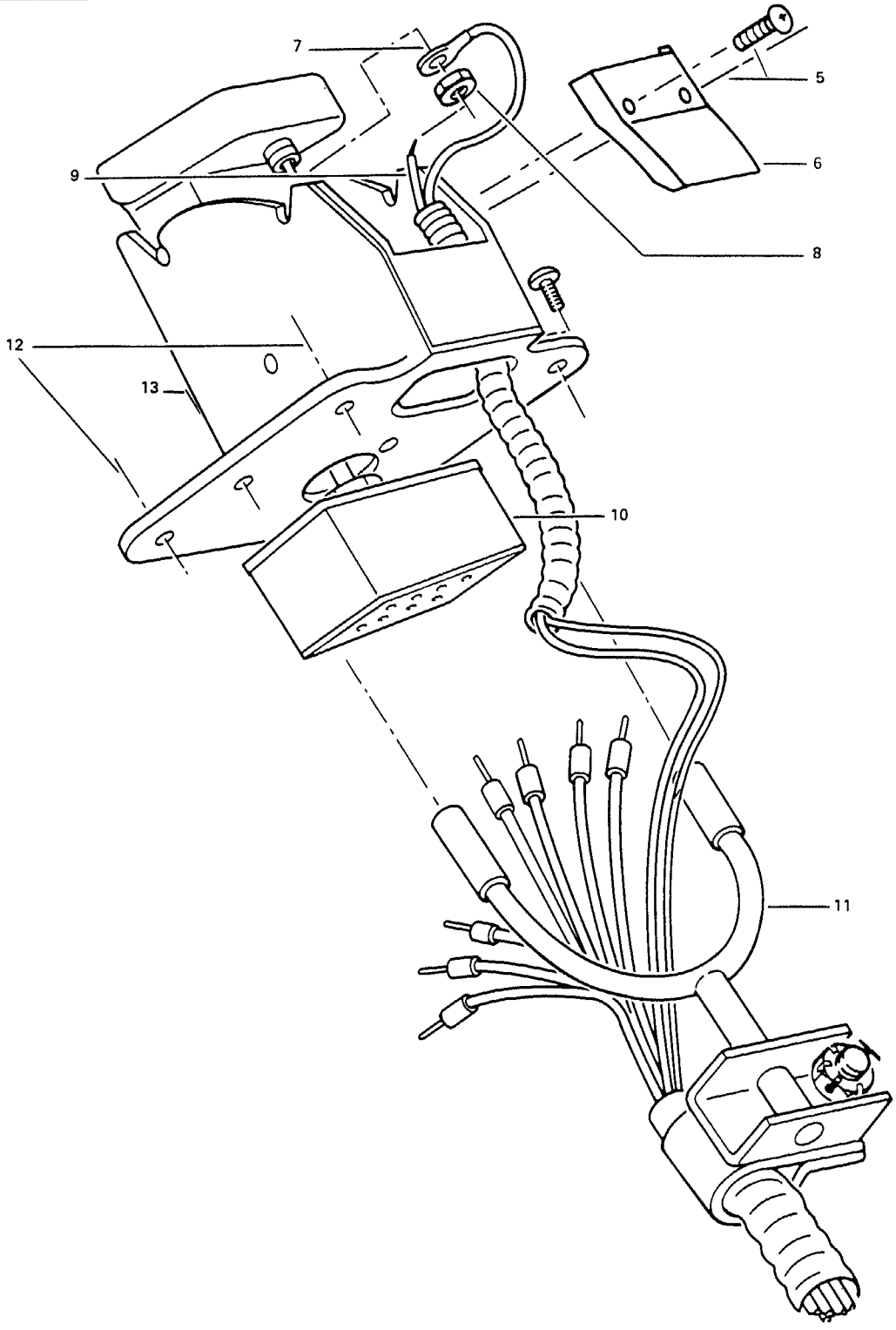
HP Fuel Shut-Off Valve Control Lever
Figure 401



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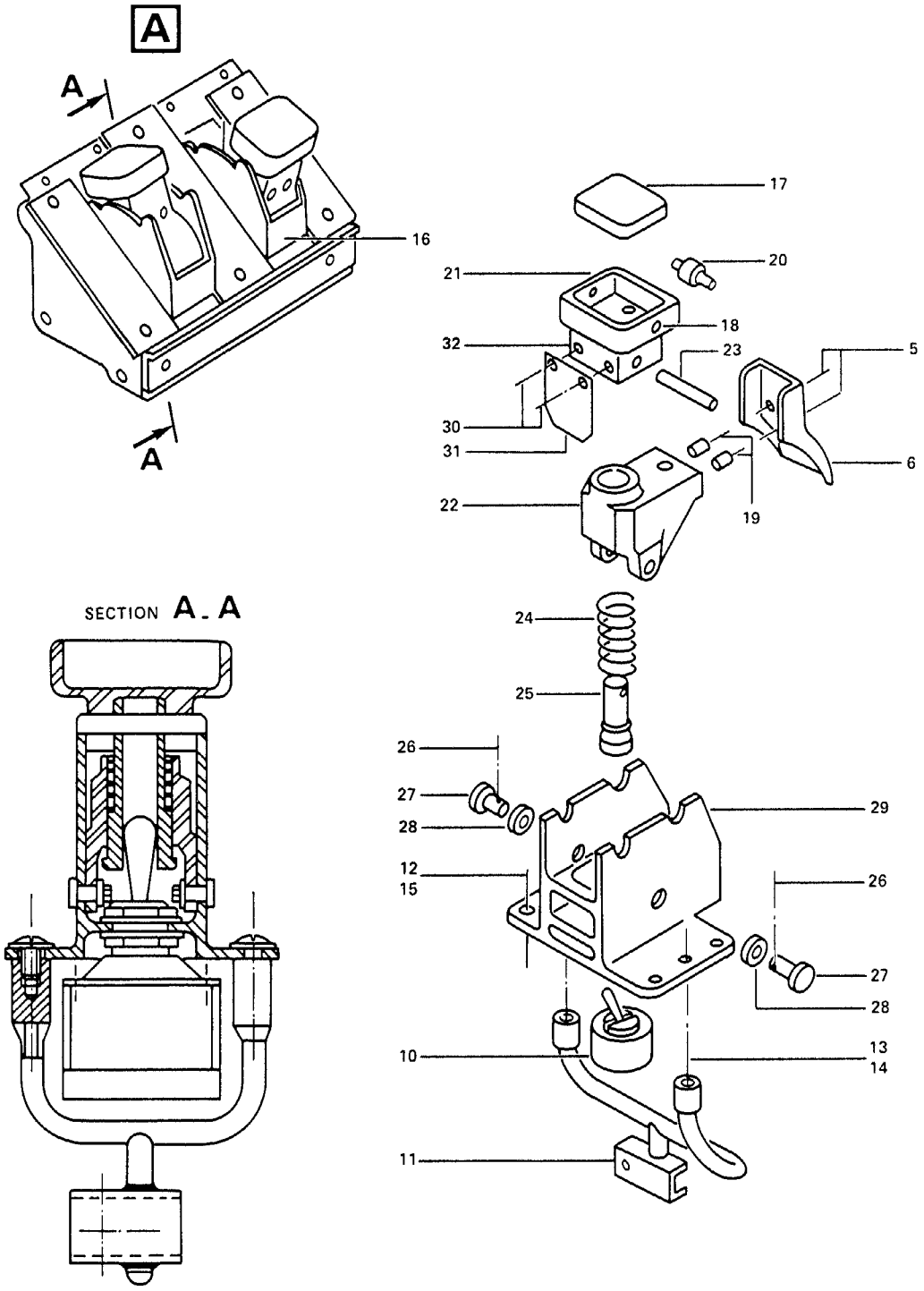
HP Fuel Shut-Off Valve Control
Figure 402



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HP Fuel Shut-Off Valve Control Unit
Figure 403

LP FUEL SHUT-OFF VALVE CONTROL - DESCRIPTION AND OPERATION

1. General

(Ref. Fig. 001)

The LP fuel shut-off valve control levers (fire handle) are located in the overhead panel between the pilots seat positions.

Each valve (one per engine) is operated by pulling its respective handle downwards. This supplies an electrical signal to close the LP fuel shut-off valve (Ref. 26-00).

The instantaneous position of each valve is indicated on panel 430VU. The fire handles are safetied by a secured lock to avoid inadvertent operation.

In case of fire warning, crew attention is drawn to the fire handle of the affected engine by red illumination.

A. LP Fuel Shut-Off Valve Control

Refer to Fire Protection (26-00).

(Chapter 26 deals with the LP Fuel shut-off valve control only).

B. LP Fuel Fire Shut-Off Valve

The LP fuel SOV (one per engine) serves to control the fuel supply from the aircraft fuel system to the engine pump/FMU.

The valves, located in the wing structure, are of the spherical plug-type, and each valve is driven by two separate electric motors. The spherical plug is rotated by 90° to travel from the OFF to ON positions.

A self-locking device prevents the valves being opened by high fuel pressures.

The valves are controlled by pull-type handles marked "FIRE" (which come on red in case of fire).

2. Electrical Operation (Ref. Fig. 003)

(Ref. Fig. 002)

The LP fuel shut off valve is powered by 28VDC from :

- Normal busbar 106PP (104PP) via circuit breaker 1QG (2QG) which is self monitored on the ground (circuit WY) and located on panel 132VU.
- Essential busbar 306PP (306PP) via circuit breaker 3QG, (4QG) which is also self monitored on the ground (circuit WY) and located on the overhead panel 22VU.

The FUEL/ENG1(2)/LP VALVES position annunciator is located on panel 430VU. It is fed from normal busbar 104PP (106PP) via circuit breaker 5QG (6QG) located on panel 132VU.

A. Closure of the LP Fuel Shut Off Valve

When ENG FIRE handle is pulled, the two contacts in module 39WD (40WD) close, which simultaneously feeds the "SHUT" coils of the two motors.

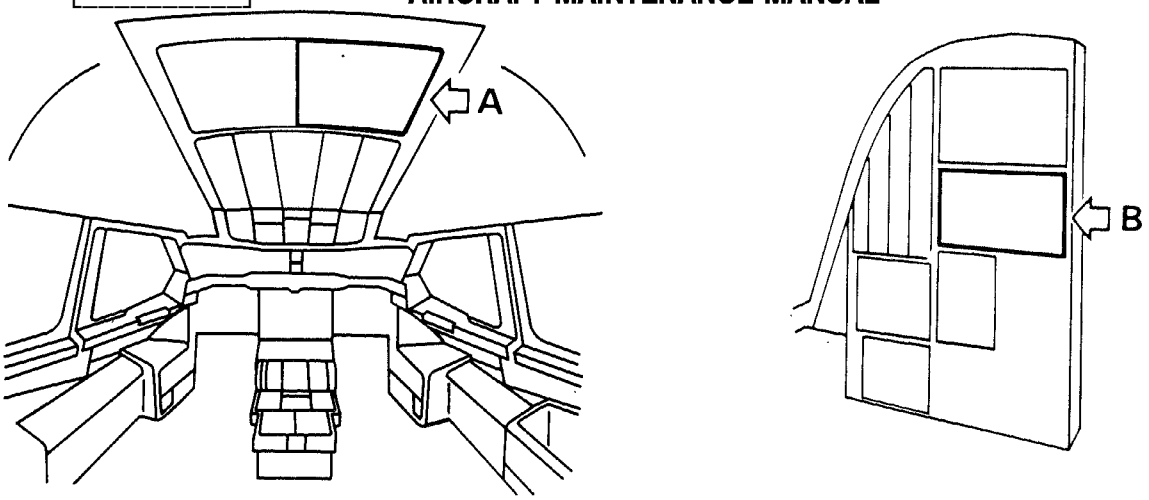
A failure detection device is provided to monitor correct operation of both motors.

After the motors have started to run, "OPEN"contacts of 13QG (14QG) open.

During rotation of the valves, FUEL/ENG/LP VALVES annunciators are off.

When the valve reaches its closed position, the contacts "SHUT" close with the following results :

- illumination of the amber SHUT legend on the LP VALVES annunciator



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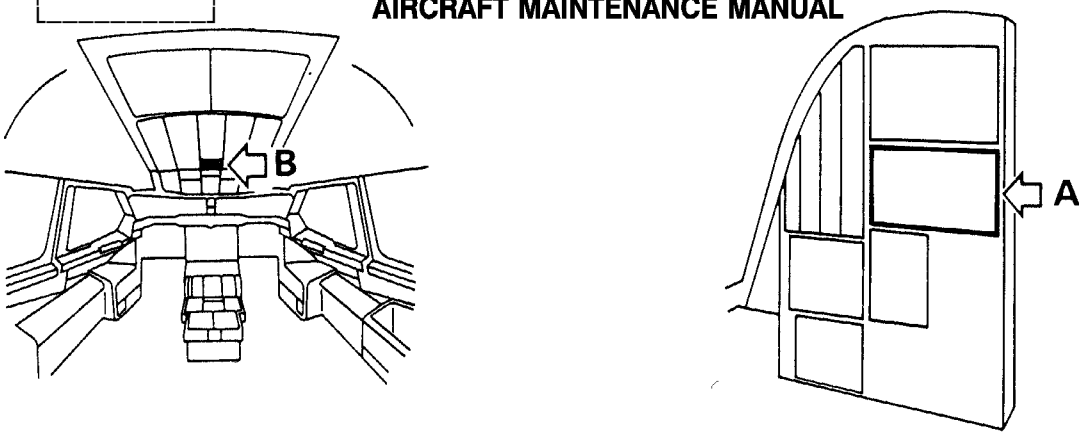
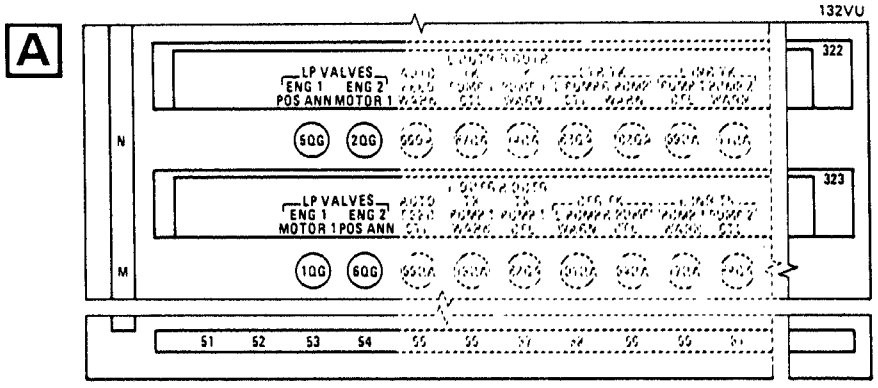
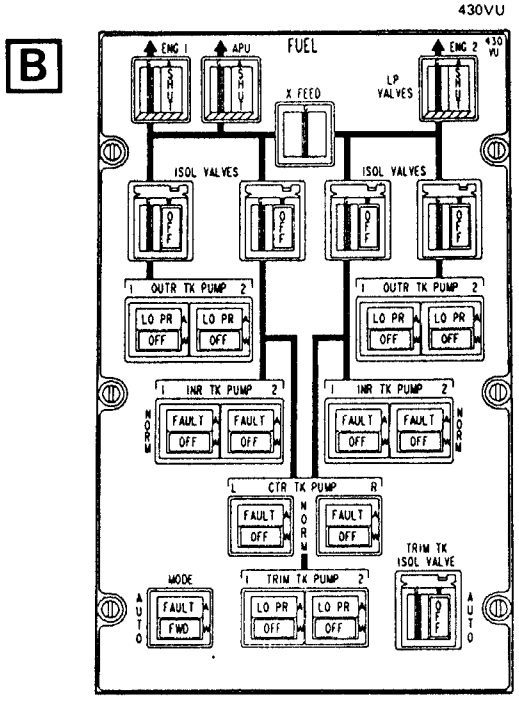
Component Location
Figure 001







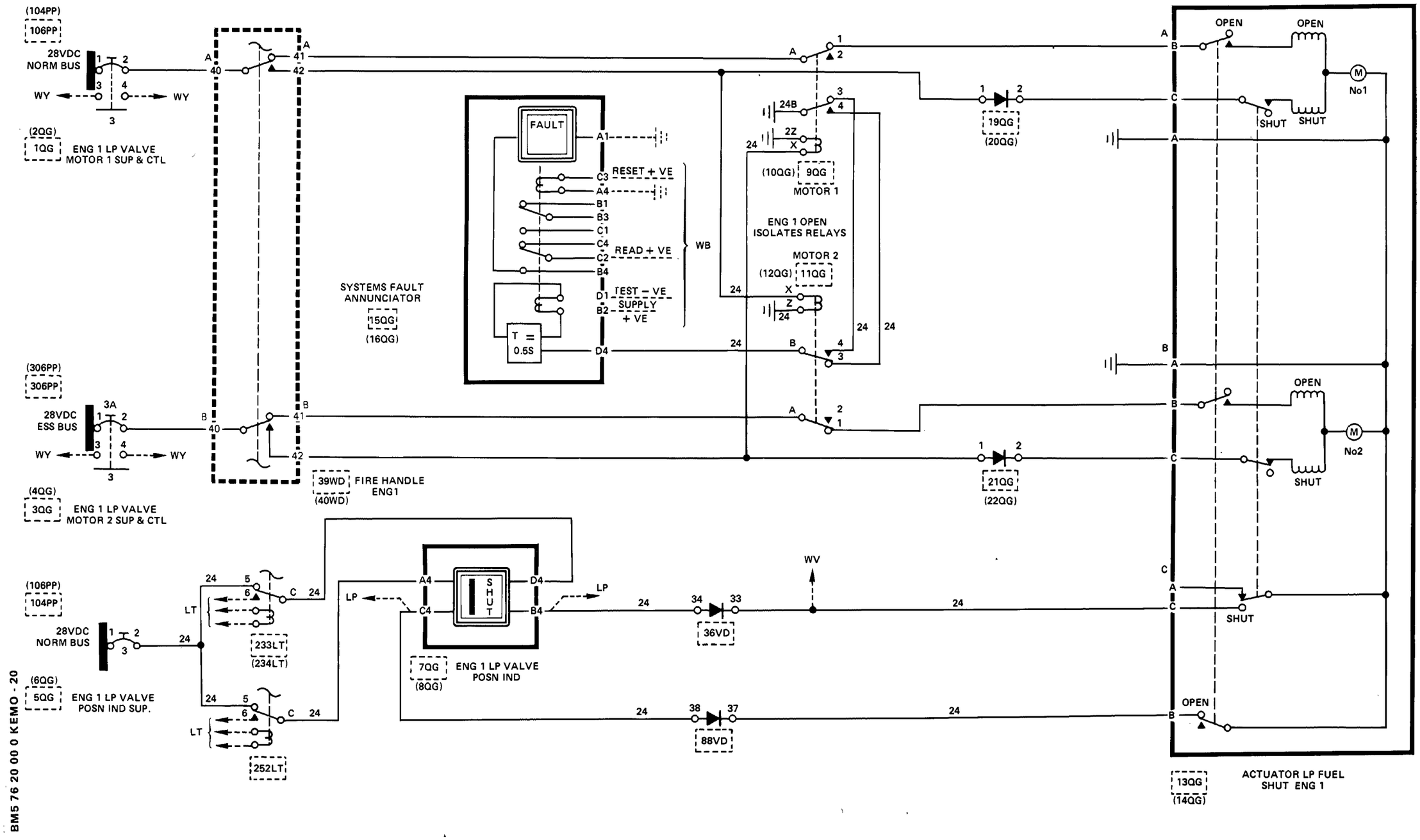
LP Shutt-Off Valve Component Location
Figure 002

- powering of the L ECAM display unit which provides the crew with information on the action to be taken.

B. Opening of the LP Fuel Shut Off Valve
When ENG FIRE handle is returned (pushed back) to its initial position, the two contacts in module 39WD (40WD) are de-energized. The two relays 9QD (10QG) and 11QG (12QG) are no longer powered. As a consequence, power is fed to the "OPEN" coils of the two motors.
After the motors have commenced running, the "SHUT" contacts of 13QG (14QG) close.
During transit of the valves, FUEL/ENG/LP VALVES annunciators are off.
When the LP fuel shut-off valve is fully open, the "OPEN" contacts of 13QG (14QG) open with the result that the continuity flowbar comes on on the annunciator.

C. Engine Fire (26-00)
In the event of an engine fire having been detected
- the red HP VALVE ENG1 (HP VALVE ENG2) warning light in the HP fuel shut-off valve control lever comes on
- the red ENG1 FIRE (ENG2 FIRE) warning light in the fire handle comes on
- the LOOP A and LOOP B warning lights of the engine concerned come on

The actions to be taken in such case are :
- reduce throttle
- close HP fuel shut-off valve
- pull the fire handle which will have the following effect :
  . extinguish the LOOP A and LOOP B warning lights
  . illuminate the white SQUIB legends of AGENT1 and AGENT2 pushbutton switches (fire extinguisher bottle 1 and 2)
  . closes the LP fuel shut-off valves
  . closes the hydraulic fire valve
  . cuts off cabin air conditioning
  . cuts off de-icing
  . cuts off electrical energization of the generators
- pressing AGENT1 pushbutton switch (white SQUIB legend on), discharges the contents of the first freon bottle located inside the pylon.
  When the bottle is empty the amber DISCH legend comes on.
  If after 30 seconds the fire is still not extinguished, discharge the second fire extinguisher bottle by pressing AGENT2 pushbutton switch.



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Electrical Circuit
Figure 003